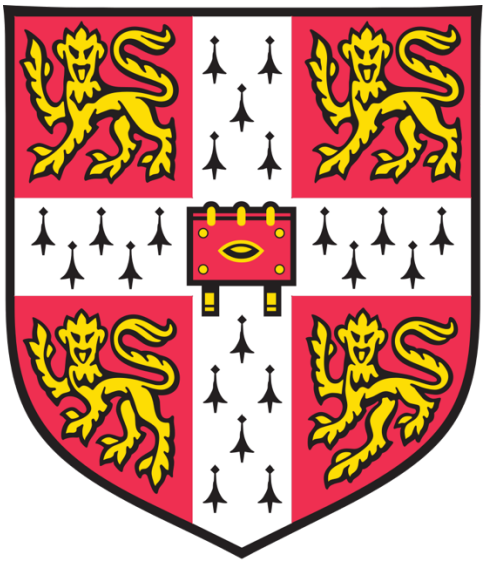
Does Screen Time Help or Hinder Toddlers' Development of Prosocial Behaviour?



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Declaration

This dissertation is the result of my own work and includes nothing which is the outcome of work done in collaboration except as declared in the introduction and specified in the text of each chapter.

It is not substantially the same as any work that I have submitted, or, is being concurrently submitted for a degree or diploma or other qualification at the University of Cambridge or any other University or similar institution except as declared in the Preface and specified in the text. I further state that no substantial part of my dissertation has already been submitted, or, is being concurrently submitted for any such degree, diploma or other qualification at the University of Cambridge or any other University or similar institution except as declared in the Preface and specified in the text

It does not exceed the prescribed word limit for the Psychology Degree Committee.

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Abstract

Although an important topic of discussion amongst parents, the impacts of screen use in toddlerhood and early childhood are not well studied. In particular, although some developmental outcomes (i.e., sleep and aggression in older children) have been considered in relation to screen time, much less is known about how screen time might affect prosocial behaviour, a key area of development in early childhood.

The current prospective longitudinal study involved a sample of 195 (predominantly affluent and educated) families in the East of England and aimed to add clarity to discussions around screen time and prosocial behaviour by investigating the impacts of screen time on early empathic and sharing behaviour. Three main questions were addressed: (1) What is the landscape of technology use – how much technology are young children exposed to, what variety, and how does this change over time? (2) What patterns are seen across time and constructs in prosocial behaviour, and how do individual children vary in empathic concern and sharing behaviour? and (3) How do screen time, content, and screen format relate to prosocial behaviour in toddlerhood?

Both mothers and fathers in the study completed interviews and questionnaires and semi-structured observations of children were taken at three time-points, when children were 14-, 24-, and 36-months of age. In addition, an objective coding scheme was developed and utilised to establish how much prosocial behaviour was portrayed in the programmes and films children were watching at age 24-months.

In line with prior research and national organisational findings, children in the current study were exposed to screens from an early age and watched programmes that were often not rated as developmentally appropriate for their age group. In addition, while parents were typically able to evaluate levels of antisocial content in programmes, they showed less success at identifying contrasts across programmes in levels of prosocial behaviour. Expanding on a large body of research about longitudinal trends in prosocial behaviour, the current study found that children are

capable of showing empathic concern from age two and being generous from age three; however, each of these measures showed marked individual differences. From 24-months to 36-months there was some stability in empathic concern. Finally, the current study suggests that the quantity of screen time is not wholly detrimental for prosocial behaviour in toddlerhood and there is evidence for a transfer deficit of social content for prosocial behaviour. The pacing of programmes appears to at least partially alleviate this deficit. All of the discussed findings have implications for families, policy-makers, and content-creators.

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I dedicate this dissertation to my grandparents and parents – The best prosocial models a girl could ask for!

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Chapter 1. Introduction

In 1961, before it was a matter of course that homes had a television, before the internet, and before the introduction of the smart phone, Schramm, Lyle, and Parker published a book titled Television in the Lives of Our Children. The authors wrote, "consider a typical child, born into the age of television. In his home the view through the picture tube is as much a part of the home setting as the view through the picture window. The sounds of television and radio blend into his surroundings like the wallpaper" (p. 24). Since this seminal work, technology has become pervasive in the lives of children everywhere, offering an even stronger influence on children's thoughts and behaviours than ever before. Indeed, technology may influence basic social skills, such as helping, sharing, and empathizing, which need to be acquired from a young age to ensure a society that is both moral and prosocial. This introduction will first discuss the influences of technology in children's lives, then will give a brief overview of early prosocial development. Following that, there will be a short discussion of how technology might contribute to prosocial development. Finally, the framing study for this work will be described and my individual contribution will be reported. This chapter concludes with an outline of what will be included in this dissertation.

The current study has three main goals:

1. To investigate the patterns of technology use in a specific study sample of children in the east of England – how much technology are young children exposed to, what variety, and how does this change over time.

2. To investigate early empathic concern and sharing – what patterns are seen across time and constructs, and how individual children vary; and

3. To investigate how screen time, content, and context influence prosocial behaviour in toddlerhood.

To do this, questionnaire data was collected at three time-points, when children were 14-months, 24-months, and 36-months of age. Detailed interviews about technology use were conducted with each parent when children were 24-months old, and detailed objective coding was conducted on children's television content to establish the extent to which the content demonstrated prosocial behaviour, as well as to note formal features of programmes, such as pace, narrative style, and animation. Children's prosocial behaviour was measured using two observational tasks – a crying baby task (Nichols, Svetlova, & Brownell, 2015) to measure empathic concern, and a dictator game task (Benenson, Pascoe, & Radmore, 2007) to measure sharing. The overarching literature that informed study hypotheses will be discussed below, and specific literature and hypotheses are discussed in each chapter.

Screen time is a loaded term and may reflect a number of different definitions. For the current project, screen time is used as a catch-all term to refer to television content viewing by toddlers. Questionnaire measures asked parents about television time as well as handheld device time. Large immobile screens and mobile devices are fundamentally different, as one can be carried around and used on busses and trains and one must be watched from one location. In addition, mobile devices offer opportunities for interactive use, such as by playing games or taking photographs.

However, in interviews with parents at 24-months, it became clear that mobile device screen usage in toddlerhood involved children in the current study viewing television content the vast majority of the time—most children were not using applications. This trend was taken into consideration with the project's emphasis on the recently neglected area of

television content research, and a decision was made to create one screen time variable that included all of parents' reported screen time.

In addition, all screen time was considered to be passive. In the current work, passive is not intended to imply that screen viewing does not involve cognitive activity and processing. Instead, 'passive' is used to refer to screen time that does not involved physical manipulation of a device that involves changing a story or playing a game. Anderson and Hanson (2010) describe in detail how children learn over time to attend to the conventions of television such as image and sound qualities that pull attention toward something specific on screen. In addition, as they grow up children learn how to comprehend the dialogue and images on screen (Anderson & Hanson, 2010). All of these learning processes require attention and time, and contribute to children's ability to learn other information from screen exposure, such as prosocial behaviours. As such, it should be understood that television viewing is not a passive activity insofar as it requires little to no cognitive effort, but is considered passive in the current work insofar as it does not require physical manipulation in the way an application does.

Finally, there are several important uses of screens that have not been thoroughly investigated in the current work. Firstly, video chatting has become an important method of communication for children in the recent past (e.g., McClure, & Barr, 2016), and children may be able to learn through video chatting (e.g., Roseberry, Hirsh-Pasek, & Golinkoff, 2014). Though descriptive information about video chatting is included, the quantity of time spent video chatting has not been included in overall screen time estimates. This is largely due to the focus on television content viewing, but is also in part due to parents' suggestion that video chatting tended to occur with a child for only a few moments before toddlers wandered off. In addition, this data was only available at age 24-months, and therefore

could not be added to the screen time variables for all three time points and would have rendered the screen time estimates over time unable to be compared.

Secondly, background television was not explored in detail. Anderson and Pempek (2005) define background television as 'programming to which very young children pay little overt attention.' This may include adult programming or programming created for older children that is not of real interest to the child who is exposed. Incidental screen exposure via background television or exposure to parental device use is important to consider when investigating children's screen time, and has been found to be detrimental to parent-child interactions (e.g., Pempek, Kirkorian, & Anderson, 2013), among other important contexts for development. However, the current project was focused on children's television content exposure. Therefore, incidental screen exposure was not included in current analysis, but should be considered in further study.

In sum, although screen time can refer to a number of different screen exposures, the current study utilises the term 'screen time' to refer to children's parent-reported time spent watching television and on mobile devices, which are considered as being used for television content viewing. Screen time measures are more thoroughly explained in Chapters 3 and 4.

1.1. Technology in children's lives

An internet search for "how much TV is ok for toddlers" produced 75,900,000 results (searched using Google.co.uk, 17 June, 2019). The Royal College of Paediatrics and Child Health (RCPCH) in the UK and the American Academy of Pediatrics (AAP) in the USA have put out guidelines in the recent years that discourage screen use in very young children, especially under age two-years (AAP, 2016; RCPCH, 2019). When investigating the proportion of children engaging in screen time, official reports often begin at age three-

years; Ofcom (2018a) stated in their annual report that 96% of three- to four-year-old children watched TV (on a TV set) for 14 hours a week, and 52% go online for nearly nine hours a week. Though the children in the above studies were older than the children in the current study, these numbers are striking, and suggest a trend of media literacy before the age of three. Some empirical work has reported average screen time for younger children; indeed, children in the current study were exposed to, on average, 1.05 hours of screen time each day (*SD* = 1.37) at age four-months (Ribner & McHarg, 2019). This finding is not unique; Beyens and Eggermont (2014) found that 96.3% of the 844 six-month-old to six-year-old children sampled were regularly exposed to television. Madigan, Browne, Racine, Mori, and Tough (2019) reported that weekly screen time on average at 24-months was 17.09 hours/week (*SD* = 11.99), and by 36-months was 24.99 hours/week (*SD* = 12.97). Interestingly, this fell to 10.85 hours a week by 60-months, an age when children were likely spending more time in school and therefore less time in front of screens. This decline further emphasises that even younger children might be exposed to more screens than official reports suggest. Indeed, Linebarger (2013) summarises surveys highlighting that 74% of infants were shown television before the age of two, watching about one and a half hours of screen media targeted at infants and toddlers a day, in addition to the five and a half hours of background television. Empirical work has corroborated these reports for slightly older children; Plowman, McPake, and Stephen (2010) report that even in 2005, most three- and four-year-old children had several technology devices in their homes, but there was still some disparity in who had access to the internet.

Importantly, since these findings, the internet has become more affordable and available in public places, and smart phones have made access to the internet possible in transit. Indeed, Plowman et al. (2010) report that parents of three- and four-year-old

children were aware of the debates around technology use, but were not, on the whole, overly concerned. Parents highlighted that studies say contradictory things and that, perhaps, technology is not all bad; however, parents did have more concern as their children got older (after 15 months) and had more independence. Notably, scholarship is missing on whether or not parents are following guidelines and limiting screen use and whether parents' rules and limits change as children grow.

Unfortunately, in contrast to the large number of popular articles and blogs about children's screen time, empirical research on the effects of screen time in toddlerhood is limited. There has been some research addressing educational benefits (e.g., Hirsh-Pasek, et al., 2015) and executive function deficits (Lillard, Drell, Richey, Boguszewski, & Smith, 2015; Lillard & Peterson, 2011) related to screens in pre-school aged children. In addition, an extensive amount of research has focused on the transfer deficit children experience when taking information from a two-dimensional screen to the three-dimensional world (see Barr & Linebarger, 2017). This deficit involves an inability to transfer what was seen on screen to real-life experiences; often this has been studied by showing a child how to complete a simple task, such as a puzzle, on screen, and then seeing if the child was able to replicate the behaviour of the model on screen (e.g., Zimmermann et al., 2015). Importantly, all of these studies involve investigating a transfer deficit of more academic-type information rather than social skills and information. More investigation into whether there is a transfer deficit of social information is needed.

However, less research has focused on the impacts of the screen time children are experiencing on a regular basis, and whether there is a naturalistic transfer deficit. One outcome that has been investigated is sleep. In older children and adolescents (Hale & Guan, 2015) and in infancy (Ribner & McHarg, 2019), screen time appears to have a

negative impact on sleep. Screen time has also been implicated in general development. Madigan et al. (2019) found that, in a very large 2441 mother-child dyad sample, higher screen time at 24-months was related to poorer achievement in a battery of developmental milestones (using the Ages and Stages Questionnaire; ASQ) at 36-months, and higher screen time at 36-months was related to lower scores on the ASQ at 60-months. Importantly, however, this study relied exclusively on maternal report, and associations, though significant, were relatively weak. In addition, the impact of screen time at 24-months on task performance at 60-months was not reported. More thorough longitudinal research is needed – research that includes associations between screen use and developmental outcomes across all time-points, and research that teases apart different aspects of development for which toddlerhood is a crucial time.

1.2. Prosocial behaviour development[1]

One aspect of development that is particularly important in toddlerhood is prosocial behaviour, which increases rapidly during this developmental period. Indeed, humans are social beings from birth (Heyes, 2018), and toddlerhood is a critical period for prosocial behaviour and socialisation (e.g., Brownell, 2016). Prosocial behaviour covers a wide range of behaviour – helping someone who has fallen over, supporting someone in accomplishing their goals, sharing resources, comforting someone who is upset, or celebrating with someone who has heard good news. These behaviours are distinct and separate, with separate developmental trajectories (Paulus, 2014). The current project focuses specifically on empathy development as an early appearing aspect of prosocial behaviour (see Chapter 2).

[1] Some of the literature review in this section has been published in collaboration (McHarg, Fink, & Hughes, 2019). The overlapping work is my own.

1.2.1. Empathy. The development of empathy has been extensively debated – some researchers theorise that empathy is a cognitive process that hinges on understanding another's emotional state (e.g, Baron-Cohen, Knickmeyer, & Belmonte, 2005), whilst other researchers define empathy as something closer to emotion contagion, which is an early manifestation of empathy. Conceptualising empathy in this way includes understanding empathy as situations in which one feels the emotions of another, rather than the emotions appropriate to one's situation (e.g., Hoffman, 2000). Heyes (2018) argues that there is a dual process to empathy. Someone sees another individual in an emotional situation, identified either by another's response or by understanding a situation to be emotional, such as when someone relays sad personal news or when watching someone win a race, be that positive or negative. Then, there is motor and somatic activation that, together, produce an automatic response. Extrapolating on Heyes' work, this response may be conceptualised as personal distress, in the case of an upsetting stimulus (Eisenberg, Fabes, & Murphy, 1996). Personal distress is self-focused and may not lead to empathic concern or sympathy (e.g., Eisenberg, Fabes, & Murphy, 1996), as personal distress may cause an inability to move on to the process of cognitive and metacognitive appraisal, which typically follows the initial response. This process of appraisal (defined as "consit[ing] of matching emotional associations," p 500) affects both the tapering of the automatic response and the controlled response (Heyes, 2018). For the purposes of this project, this controlled response is operationalised as empathic concern (as in Nichols, Svetlova, & Brownell, 2015). In Heyes' model, the automatic response is more similar to the emotion contagion Hoffman (2000) describes, and the controlled response after appraisal is more similar to Baron-Cohen et al.'s (2005) understanding of cognitive empathy, which centres on taking the perspective of another in contrast to the feelings of another.

Heyes (2018) and others (e.g., Hoffman, 2000) have suggested that the physical, emotional response to another's distress develops before the ability to use cognitive and metacognitive processes to empathise with others. Indeed, before one can respond to another's distress prosocially, one must have the ability to regulate one's own emotions (e.g., Kärtner, Keller, & Chaudhary, 2010), the cognitive ability to understand that the feeling one is having is due to another's situation (Brownell, 2013; Nichols et al., 2015; Zahn-Waxler & Radke-Yarrow, 1990), and the physical ability to respond. All of these processes begin to develop early in life and are refined as children get older. Chapter 2 discusses the pertinent developmental projections as they relate to the current project in more detail.

1.2.2. Sharing. The development of a propensity to share has been less clearly defined than the developmental trajectories of helping and empathic behaviour. Chapter 2 lays out what is known about the development of sharing. In sum, when children understand ownership (typically by the age of two-years) they are able to, and tend to, share their resources and toys. Unlike empathic responding, which often does not require any sacrifice, sharing requires an individual to give up meaningful resources. Blake (2018) reviewed studies in which children were presented with a dictator game, in which hypothetical characters have resources to share and children were asked how much they think was appropriate for the characters to share. Most children indicated that one should share half of their resources, but when then faced with a dictator game where they were the ones who must share the resources they were given, they did not share equally. Blake (2018) argues that this discrepancy decreases as children get older; however, the earliest study he reviews tested sharing in three-year-old children. After the age of three-years, children's growing self-regulation (their ability to regulate their own emotions), theory of mind (understanding that others have different thoughts and feelings than oneself), moral

knowledge (early understanding of distributive justice), and social learning (experiencing generosity from peers and caregivers and beginning to understand these social norms) help to shift the tendency from sharing less to sharing more equitably (Blake, 2018). Each of these processes helps children understand the needs and desires of others, and they all promote sharing. In addition, as children grow older, they have a deeper understanding of, and appreciation for, reciprocal sharing (Leimgruber, 2018). Reciprocal altruism is important for cooperation, and humans around the world act altruistically, assuming their actions will be reciprocated in the long run (Leimgruber, 2018). Much of the work on sharing concerns older children, and the current project focuses on children aged three or less. Sharing has been observed in younger children; children between 18- and 24-months of age shared equitably (58% of the time), and were especially likely to share when they worked collaboratively (Ulber, Hamann, & Tomasello, 2015). The current work expands knowledge of sharing in toddlerhood.

1.2.3. Genetic influences on prosocial behaviour. One need only walk into a nursery classroom to know that children are not always the most generous with toys, and have to be reminded to share more often than not – there are vast individual differences in prosocial behaviour that may be rooted in differences in biological aspects of prosocial behaviour. In a twin-study of three-and-a-half-year-old children, Knafo-Noam, Vertsberger, and Israel (2018) established that 24% of the variance in sharing was heritable (the other 76% was due to non-shared environment and error) and a full 50% the variance in comforting behaviour was heritable (again, the remaining variance was explained by non-shared environment and error). In contrast, Warrier et al. (2018) established that, in a study of adult twins, cognitive empathy was only 28% heritable. Heyes (2018) argues that the heritability of empathy is fundamental to the innate reactions to another's distress, but it is a series of learned

associations that allow us to name this distress and respond to it. Thus, the contrast seen between heritability of comforting, which may require an element of feeling the same emotion, and cognitive empathy likely hinges on how complex an empathic response is. Heyes (2018) notes, however that "every biological characteristic depends on a rich, turbulent stew of genetic and environmental factors" (p 502) and asserts that both emotion matching and the more cognitive aspects of empathy are, at least partially, learned.

1.2.4. Environmental influences on prosocial behaviour. Importantly, prosocial behaviour, though ubiquitous (e.g., Callaghan et al., 2011) and seemingly biologically linked (e.g., Warrier et al., 2018), does not develop in a vacuum or in the same way for every person. Eisenberg, Fabes, and Spinrad (2006) argue "prosocial action appears to be the outcome of multiple individual (including biological) and situational factors" (p 698). Indeed, parents and caregivers, (Brownell, 2016) and even siblings (Hughes, McHarg, & White, 2018), can influence prosocial development.

The NICHD Early Childcare study found that lab-based observations of 612 parent-toddler dyads revealed that individual differences in maternal sensitivity at 24-months were modestly, but significantly (r = .14, p < .01) related to the frequency of 36-month-olds' displays of cooperation, but unrelated to variation in toddlers' concern for a close peer (Blandon & Scrimgeour, 2015). In contrast, in a recent smaller study of 58 18-month olds, variation in maternal positive parenting was unrelated to toddlers' instrumental helping and only weakly and marginally significantly (r = .23, p < .10) related to toddlers' comforting responses (Schuhmacher, Collard, & Kärtner, 2017). This between-study contrast in the parental correlates of empathy and helpfulness/cooperation may indicate that associations between sensitive/positive parenting and particular aspects of prosocial behaviour are developmentally specific. However, methodological contrasts also deserve note. In

particular, while the NICHD study applied nursery-based naturalistic observations to rate concern for peers in 36-month-olds, Schuhmacher et al. (2017) adopted an experimental approach involving an adult display of distress to assess empathy in 18-month-olds. More research into parental influences on early prosocial behaviour is needed to elucidate the picture, as some researchers have suggested that parental encouragement may not make a difference in some prosocial behaviours (Warneken & Tomasello, 2013), and some socialisation may be more indirect and difficult to observe (Brownell, 2016; Warneken & Tomasello, 2013). Indirect socialisation may include understanding social norms of prosociality by watching others; what children see on screens may contribute to this indirect socialisation.

Considering the non-shared environments of twins, Deater-Deckard et al. (2001) found that, when mothers gave their three-and-a-half-year-old twins different treatment, the one to whom more supportive and less punitive parenting was given had higher prosocial scores on the Strengths and Difficulties Questionnaire (SDQ). Prosocial scores were related to observed negative control during an etch-a-sketch task (r = -.25, p < .05) and parent-reported negativity (r = -.42, p < .01). In addition, parents' self-reported positivity was related to prosocial outcomes (r = .41, p <.01); observed positivity was unrelated. These results are important as they directly implicate the environment in prosocial behaviour development, but the Deater-Deckard (2001) study was limited to mothers. Fathers and other primary caregivers may influence the development of prosocial behaviour differently than mothers, and should be included in socialisation research. Daniel, Madigan, and Jenkins (2016) found that both mother-reported and father-reported parental warmth were modestly related to parent-reported increases in child prosociality over a 36-month period (when children were between 18- and 36-months old). Further, mothers' and fathers'

parenting influenced the other parent's warmth in modest but significant ways, highlighting the importance of considering dynamic family models in the development of prosocial behaviour. Both of these studies, though important for identifying environmental influences on variance in prosocial behaviour, relied heavily on self-reported warmth and prosocial behaviour, and therefore may not be the most reliable. Newton, Thompson, and Goodman (2016) addressed this concern by measuring mothers' mental states during a book reading task, and their warmth during a free-play session with their 18-month-old infants. Children's helping and sharing were directly observed in a battery of tasks. Maternal sensitivity (*OR* = 2.49) and mental state talk (*OR* = 1.17, 95% CI = .020 – 1.68) were related to the likelihood children would be moderately prosocial. Maternal sensitivity (*OR* = 3.45 95% CI = 1.63 – 7.33) and an interaction between sensitivity and language during the book-reading task (*OR* = 0.89 95% CI = .80 – 1.00) were predictive of children being frequent helpers. Importantly, there were no direct associations between maternal characteristics and prosocial behaviour. These findings suggest that maternal characteristics contribute to prosocial development by influencing tendencies toward prosocial behaviour rather than always resulting in direct behaviour. This is key to understanding early prosocial behaviour, but fathers', other caregivers', and non-human socialisers' influences must also be investigated.

1.3. Socialisation of prosocial behaviour

When considering how television might influence prosocial development, the process of socialisation must first be understood. There are several mechanisms such as parental warmth, sensitivity, and positivity (Daniel et al., 2016; Deater-Deckard et al., 2001; Mussen & Eisenberg-Berg, 1977; Newton, Laible, Carlo, Steele, & McGinley, 2014; Zhou et al., 2002), sibling relationships (Pike, Coldwell, & Dunn, 2005; Pike & Oliver, 2016; White & Hughes, 2017), peer relationships (Mussen & Eisenberg-Berg, 1977; Schuhmacher et al.,

2017), and modelling (Mussen & Eisenberg-Berg, 1977; Williamson, Donohue, & Tully, 2013) that influence the emergence, form, and frequency of prosocial behaviour in early childhood. Several of these processes will be explained in Chapters 2 and 5, which consider socialisation in more detail. Screen content might serve to augment or undercut some of these processes through socialisation.

Socialisation, or processes such as modelling, instruction, reinforcement, behavioural control, disciplinary action, empathic caregiving, scaffolding, instrumental support, conversations about emotions and prosocial behaviour, and other-oriented reasoning (Brownell, Svetlova, Anderson, Nichols, & Drummond, 2013) can have a strong influence on prosocial behaviour (Brownell, 2016; Brownell, Svetlova, et al., 2013; Grusec, 1991; Hammond & Carpendale, 2015; Mussen & Eisenberg-Berg, 1977; Waugh, Brownell, & Pollock, 2015; Zahn-Waxler, Radke-Yarrow, & King, 1979). Parents and caregivers can, and often do, provide direct socialisation of prosocial behaviours. Brownell (2016) argues that social engagement between caregiver and child from birth contributes to prosocial behaviour development – she argues that infants are active participants in social and emotional exchanges that help to shape their social learning. These processes include imitating others doing social and prosocial things as well as parents' modelling of, encouragement of, discourse about, and nurturing responses to prosocial behaviour (Brownell, 2016). However, not all theorists agree that reinforcement is helpful to socialisation. Warneken and Tomasello (2013) argue that parental praise does not influence instrumental helping behaviour. However, this understanding followed a study where praise was investigated during an on-the-spot helping task, and the children whose scores were reported in this study engaged in spontaneous prosocial behaviour earlier (Warneken & Tomasello, 2013). Therefore, these children were already more prosocial than others, and

may have parents who have been predisposed to praise consistently prior to testing. Thus, consideration for external stimuli influencing individual differences in prosocial behaviour via socialisation must be considered. The influence of social information on prosocial behaviour goes beyond parents – Barragan and Dweck (2014) established that reciprocal interactions between 34 one- and two-year-old children and an unknown adult researcher resulted in significantly more helping (d = 1.21) and sharing (d = 0.95) from children than parallel interactions between children and researchers. Chapter 2 discusses specific socialisation trajectories for empathy and sharing.

For the current project, the impact of modelling on prosocial behaviour is a particularly important consideration. Modelling can come from direct socialisation with intent to model behaviour and can also occur as a general environmental influence, such as when children repeat behaviours they have seen someone else do even when these behaviours were not necessarily intended to be copied. Understanding the process of modelling overall can help elucidate how modelling may influence prosocial behaviour development. Famously, Bandura, Ross, and Ross (1961) illustrated that imitation was an effective learning process when their findings showed that children either an aggressive model or a non-aggressive model playing with a bobo doll; children who were exposed to the aggressive model played in a more aggressive way. Importantly, children transferred the aggression they saw into playing with a separate set of toys, not bobo dolls, illustrating that aggression in general was retained, not necessarily specific aggression toward a particular object. In a follow-up study (Bandura, 1965), some children saw models who were rewarded for aggressive behaviour. Watching the reinforced aggressive behaviour increased girls' aggression, but boys were aggressive regardless of condition. When children were also reinforced by researchers for aggressive behaviour after viewing the model, children were

more aggressive regardless of whether they saw an aggressive or non-aggressive model. Taken together, these studies suggest that children can learn aggression from models, strangers, and even from the screen, as they were in the follow-up study, but what happens when children actually enact the behaviour may make have a more substantial impact.

A decade later, researchers turned their attention to modelling of prosocial behaviour. Zahn-Waxler et al. (1979) trained 16 mothers to report when their one-and-a-half- to two-and-a-half-year-old children encountered someone else's distress and how they and their children responded. Researchers also recorded mothers' empathic caregiving during home visits. Situations that required empathic caregiving were simulated on one visit and researchers reported on mothers' natural day-to-day behaviour at each visit. Mothers' explanations about others' distress were positively related with children's reparations when they had caused trouble ($t(12) = 4.77$, $p < .001$) and were also related to children's altruism ($t(12) = 2.60$, $p < .05$). Though this study had a large amount of bias and was not experimentally controlled, this early study of parents' natural socialisation of prosocial behaviour highlights the importance of parental responses to children's behaviour and parents' help in teaching appropriate prosocial responses. More recent work has followed-up on these early theoretical ideas; Schuhmacher, Köster, and Kärtner (2018) found that 16-month-old infants were significantly more likely to help after seeing a model (either with or without a parent present for viewing) help in a similar way than when they did not see this helping behaviour ($\eta_p^2 = .14$).

Empathic responses have often been shown to be related to parental discourse and socialisation. Observational studies have shown that parents who engage in discourse about the feelings of others are likely to instil empathic concern in their children (for reviews, see Brownell, 2016; Spinrad & Gal, 2018). Likewise, experimental work has shown that viewing a

brief video of adults modelling a novel prosocial act in response to a display of distress dramatically increases the likelihood of 2-year-olds offering prosocial responses when their own parent modelled distress (η^2 = .37; Williamson et al., 2013). In a recent study of 85 five-year-old children, Kienbaum, Zorzi, and Kunina-Habenicht (2018) found that children's empathic emotional responses to a distressed puppet (defined by the authors as sympathetic responses, but more in line with empathy as it has been described here) were positively related to adults' responsiveness (r = .26, p < .05). Responsiveness was measured in interviews with children, asking them how their parents and teachers would respond in situations that caused the child to be distressed. Though not terribly strong, this association is important in considering how parents' typical responses to children's distress may affect how children respond to others' distress, as socialisation and empathic responding were measured separately, rather than as part of the same paradigm.

Parents' engagement with emotions is also important to consider for the socialisation of sharing behaviour. Parental talk about emotions also increases sharing (Brownell, Svetlova, Anderson, Nichols, & Drummond, 2013); when parents and children read a book together, parents who encouraged emotion talk had children who shared more (r = .43, p < .05). In contrast, Pettygrove, Hammond, Karahuta, Waugh, and Brownell (2013) found that most of mothers' socialisation techniques were unrelated to children's sharing, even though they were related to instrumental helping and empathic helping. The one association they did find was that mothers' reasoning was related to less spontaneous sharing (r = -.47, p < .01), which the authors suggest may be due to mothers using socialisation devices that were too complex for the 18-month old participants. In an intervention study of preschool children, Ramaswamy and Bergin (2009) found that teachers using reinforcement or induction (but not both) increased sharing by 184% over

the original level (a jump from 7 acts to 20 acts in each group). Taken together, these results suggest that there are specific rather than global effects of parental socialisation on sharing.

Conversely, modelling self-focused behaviour may also influence behaviour; Blake, Corbit, Callaghan, and Warneken (2016) found that, when parents modelled a stingy donation, children were more stingy in private (25% of children gave only one piece of candy, as their parents had, compared to 2% of children in a control group without a model who gave only one piece of candy). Narrative stories often show negative behaviours, either to show a resolution or simply to show natural variance in children's behaviour, and these behaviours may be imitated, just as much as prosocial behaviours may be emulated.

1.4. Technology and prosocial behaviour

Drotner (2013) asserts that media are meaning-making tools, as well as being important for sharing information. As highlighted above, prosocial behaviours develop in the second year of life, and modelling and socialisation foster these behaviours. Media's meaning-making capabilities may act as some of the many socialising agents in toddlers' lives. Indeed, Gentile and Walsh (2002) report that 42% of parents say their two- to 17-year-old children often or sometimes copy what they have seen on television. Some of these imitable behaviours may be prosocial. Decades after seminal research on the effects of prosocial behaviour in childhood (Paulson, 1974; Silverman & Sprafkin, 1980; Sprafkin, Liebert, & Poulos, 1975), researchers are beginning to re-examine prosocial effects of television. The hiatus in this research may be due to a number of factors. Firstly, there has been a shift in focus toward investigating the educational elements of programming, and education has been operationalised as learning academic material such as language, colours, letters, and numbers. Prosocial behaviour may be considered an important educational milestone for toddlers, but guidelines since 1999 have recommended that

children aged two-years and under not engage with any screen time (AAP, 1999) in the US, where most of the prior research on the effects of screen time took place. These guidelines may have discouraged research into the effects of television in toddlerhood as it may have been considered unethical to show children television programmes in the lab. Most importantly, screen time has changed in myriad ways since this early research – children are exposed to screens everywhere they go and it is possible to access child-directed content at all hours of the day. These changes make it even more imperative to investigate how early learning goals, such as prosocial behaviour, are influenced by screen time – both quantity and content.

More recent research has begun to pick up where the researchers of the 1970s left off. Williamson et al. (2013), in an investigation of modelling, showed half of the sample of children a video of someone in distress. Later in the video, a model comforted the distressed person. Following this, all children were observed responding to their own parents' distress. Two-and-a-half-year-old children who saw the video displayed more comforting behaviour – both directly imitated behaviours they saw in the video (main effect of condition, $\eta^2 = .37$) and novel comforting behaviours that were not directly modelled (main effect of condition, $\eta^2 = .27$). Though the goal of this research was to establish evidence for children's ability to model behaviour and the sample size was small, this study provides evidence that children were able to learn comforting behaviours on screen and transfer them to lab-based simulations of distress. In addition, watching comforting behaviour led to novel comforting behaviours, offering evidence for global effects of prosocial media.

In more direct research, Cingel and Krcmar (2017) showed 101 mother-child dyads (children ranged from 49- to 83-months old) an episode of a popular television programme.

The episode either had a moral lesson or not, and children either watched with their mother or not. Mothers were either instructed to use natural mediation, viewing the programme as they would at home including whatever prompts and conversation were natural and normal for at-home screen viewing, or were instructed to actively participate in the viewing session by asking questions about what was happening on screen. Following this, children were asked a series of moral reasoning questions (based on the Moral Interpretations of Interpersonal Violence measure). There was a main effect of condition such that children who watched the moral episode were moderately harsher on violence than those who watched the neutral episode, while there was no difference in children's moral reasoning as a function of whether or not children watched with their parents. In contrast, Mares and Acosta (2008) found that kindergarten (five- to six-year-old) students were unable to comprehend an intended moral lesson of an episode of a different popular television programme, even after researchers reiterated the overall moral lesson. The authors suggested that this lack of retention may have been due to confounding narrative elements; indeed, it is possible that programmes have too much going on for children to comprehend overarching lessons, but that does not necessarily mean that specific behaviours were lost in a larger narrative. Importantly, all of the research reported above relies on children watching a short segment of a prespecified television programme and investigates their immediate responses or understanding. It is vital to investigate the effects of television that children are habitually watching and how they act out of context.

In addition to direct modelling, screen time may teach about emotions and emotion regulation, which can in turn promote prosocial behaviour (Malti & Dys, 2018). Martins (2013) reviews research on school-aged children and asserts that emotional portrayals on screen can teach children about emotion. However, there has not been extensive research

on learning emotion regulation from screens, and less is known about young children's emotion comprehension than older children's emotional comprehension. Importantly, many emotions portrayed on screen are negative, and may result in children experiencing negative emotions. Of 527 parents of two- to 17-year-old children, 62% strongly agree or agree with the statement, "my children have sometimes become scared that something they saw in a movie or on TV might happen to them" on the MediaQuotient questionnaire (Gentile & Walsh, 2002). Of note, this study spans a wide age range and does not discriminate by age, and, thus, generalisation of this research to toddlerhood is difficult, especially since older children may actively seek out scary films. Regardless, the large proportion of parents who found they had frightened children is striking. Importantly, when children experience negative emotions due to screen content, parents and follow-up screen content such as narration and narrative elements may be able to use these moments to teach children about emotions and promote emotion regulation. This is especially important to consider because programmes often portray both prosocial and antisocial behaviour (Mares & Woodard, 2005).

1.5. Gender differences in technology and prosocial behaviour

Notably, boys and girls may watch different content or may be affected by content differently, especially as other socialising agents may treat boys and girls differently, and content that boys may be more likely to watch may be more aggressive. Indeed, in a study of five- to 13-year-old children in which a group of independent adults determined how masculine/feminine programmes were on a Likert scale, girls watched more 'feminine' television and boys watched more 'masculine' television. However, there was an interaction between sex and age ($\eta^2 = .07$) – programming became more gendered as children got older (Cherney & London, 2006). Though Cherney and London (2006) did not report what adults

described as more masculine or feminine, we may expect that male children would watch more aggressive content and female children may watch more prosocial content. Crucially, two-year-old children may not engage in 'masculine' and 'feminine' content in the same way, as they are considerably younger than five-year-old children. However, overall content analysis may reveal a different pattern. For slightly younger children, Coyne, Linder, Rasmussen, Nelson, and Birkbeck (2016) found that four-year-old children watching Disney princess content was positively associated with female-gender-stereotyped behaviour (measured with a toy preference task and parent-reported gender-stereotyped behaviour in the Preschool Activities Inventory) one year later for both boys (β = .41, p = .07) and girls (β = .65, p < .001). This association remained even after controlling for gender-stereotyped behaviour at time one; however, an aggregate of teacher- and parent-reported prosocial behaviour was not associated with princess engagement. Though these findings suggest that engaging with gender-stereotyped content does not necessarily lead to an increase in prosocial behaviour, they did find that girls were rated as more prosocial than boys (η_p^2 = .09; Coyne et al., 2016). Importantly, this is good evidence that parents and teachers do rate girls as more prosocial than boys, pointing to a possible assumption that prosociality is a trait typically associated with girls. Notably, many princess films include a large amount of aggression and sweeping prosociality, and therefore may not contain the most imitable prosocial behaviour, even if the programmes are highly feminine –there may be more prosocial programmes that are also pitched at audiences of younger girls. In addition, parents choose programming for their children, and so parents' subtle or overt tendencies toward gender-stereotyped behaviour may sway how gendered children's programming is.

1.6. Summary of literature review

In sum, research suggests that toddlerhood is a critical period for prosocial development, though there are individual differences in how prosocially children respond in situations where they could help, comfort, or share. Modelling in the environment may support and promote the development of prosocial behaviour. On-screen modelling may be part of this environment, especially since empirical and policy research suggests that children are exposed to screens from a very early age. However, several gaps in the literature need to be addressed. First, much of the research on empathic concern in young children relies on lab-based simulations of distress, and often the person in distress is a parent or unknown adult researcher. Second, research on the effects of screen content on prosocial behaviour relies on showing children a specific programme for a short time and observing behaviour directly after. Though these methods add experimental rigour, they do not have strong validity. In addition, little is known about at home family screen time – whether toddlers are watching programmes with their parents, whether parents are following guidelines and enforcing rules, and how screen time in the home changes over time. Finally, by investigating behaviour directly after viewing, researchers have failed to examine whether children retain what they see on screen and whether they are able to transfer prosocial behaviour seen on screen into everyday behaviour without prior priming. This method of investigating behaviour after watching a programme also fails to address whether screen time on the whole may be affecting children's prosocial behaviour by taking them away from other activities, as the overall amount of screen usage was not investigated.

1.7. The current study

Addressing the above gaps, the current study utilised a longitudinal, large-sample study and a mixed-method, multi-informant approach to investigate prosocial behaviour and screen time in toddlerhood.

1.7.1. Prosocial behaviour. A crying baby paradigm (CBP; adapted from Nichols et al., 2015) was used in home and nursery settings, instead of using lab-based simulations of distress for observe empathic concern. This paradigm allowed for investigating a child's response to an infant in distress (rather than an adult), and allowed for experimental rigour of the distress signals, which was a pre-recorded baby crying played via a blue-tooth speaker. Most importantly, the CBP allowed children to be in comfortable, familiar places which added an important naturalistic element to the study. We also utilised a simple dictator game task (Benenson et al., 2007) in these same familiar settings. This measure was chosen to reduce the burden on the children, who had completed a large battery of tasks for the larger study, and to investigate sharing with an unknown peer without recruiting a sample of peers. Stickers were chosen as the reward so that children could take the ones they kept home with them as a thank you for taking part in the study.

1.7.2. Television content. To achieve a more naturalistic measure of television content, rather than showing children short programmes, the current study aimed to examine what programmes children were watching at home. To this end, parents were interviewed about what programmes their children watched as well as when children were watching, with whom, and whether parents had rules around screen time. Following the interviews, researchers watched an hour of each programme and recorded the number of prosocial behaviours and antisocial behaviours, as well as a number of formal features (e.g., whether or not programmes were animated and scene length). This coding was then

averaged across programmes for each child to establish what sort of content children were exposed to on a regular basis. This coding also allowed for close inspection of the programmes that children are watching as a group, which made it possible to highlight patterns in popular children's programming.

1.7.3. Technology and prosocial behaviour. Finally, an important feature of the methodology of the current study was in not priming children with prosocial media directly before prosocial tasks. By utilising parent-reports and later objective coding to establish prosocial television viewing, it was possible to examine prosocial behaviour in a completely separate situation. This distance allowed for some amount of assumption of retention and long-term transfer of television content.

1.7.4. Overarching gaps addressed. As outlined above, the overarching gaps in the literature that the current study addresses are: 1. establishing what technology use in the home looks like for children in the current sample – what are children watching, with whom, when, and why; 2. building on a growing body of research investigating early prosocial behaviour development, specifically investigating the development of empathic concern and sharing, and how they relate to each other; and 3. ascertaining whether screen content and/or screen time influence prosocial behaviour development.

1.8. Project details

Data were collected as part of a multi-site prospective longitudinal study, the New Fathers and Mothers Study, which took place in The UK, The USA, and The Netherlands. The overarching aims of the NewFAMS included investigating the transition to parenthood and the first couple of years of life for new families. In particular, parents' wellbeing and children's adjustment, especially in the face of struggling parents, were key research areas. Children's self-regulation development, including executive function development, and

overarching family functioning were investigated as part of the framing work that investigated couples becoming families of three. Importantly, everything that was done with mothers was also done with fathers, so that their unique experiences were identified.

The data collected for this project was only collected for the UK arm of the study, which was funded by the ESRC. Families were recruited via antenatal hospital visits, enabling contact with men and women about to become fathers and mothers. Families were visited in their homes when their children were 4-, 14- and 24-months old. In addition, children were visited either at their nursery schools (109), with their childminders (5) or their homes (56) when they were 36-months old. The current project focuses on the 14-, 24, and 36-month waves of the project.

All participating parents were in a cohabiting heterosexual relationship and the target child was the first-born child for each participating parent to minimise variation due to family form. This is particularly important because children with siblings may be exposed to different television content than children without siblings, due to older siblings engaging in content created for older children. In addition, there may be differences in prosocial development for children with siblings (e.g., Hughes et al., 2018). All parents spoke English exclusively to their children. Education levels in the sample were high: 85% of mothers and 78% of fathers had Bachelors' Degree or higher tertiary qualification. These percentages are considerably higher than the national average across the UK (42% of people aged 21-64 have higher education qualifications; Higher Education Student Statistics, 2018), and the average in Cambridge (41% of people in Cambridge have a "high level of educational qualification", World Population Review, 2019).

The sample was largely racially homogeneous, with 92.4% of mothers and 94.9% of fathers self-identifying as White, 2.0% of mothers identified as Black, 2.5% of mothers and

3.0% of fathers identified as Asian, and 3.0% of mothers and 2.0% of fathers identified as other. This is higher than the population in Cambridge (89% white), but around the national average (92% white; World Population Review, 2019).

The sample was also older for new parents; at the target child's birth, mothers' mean age was 32.60 years (*SD* = 3.60) and fathers' mean age was 33.97 (*SD* = 4.35). In addition, the sample was relatively affluent; at the 14-month visit, mothers' (N = 184) mean level of personal income was £1,574.51/month (*SD* = 978.53) and fathers' (N = 175) mean level of personal income was £2,767.08 (*SD* = 1501.60). Similarly, at 24-months, mothers' (N = 174) mean level of personal income was £1,562.96/month (*SD* = 1100.17) and fathers' (N = 174) mean level of personal income was £2,870.16 (*SD* = 1438.98). At 36-months, mothers' (N = 150) mean level of personal income was £1,905.98/month (*SD* = 4542.92) and fathers' (N = 132) mean level of personal income was £3,549.29 (*SD* = 4199.77).

Overall, the study had high retention rates. 195 families (Children: 108 boys, M_{age} = 14.42 months, SD = .59) participated in the 14-month visit, 187 families (Children: 106 boys, M_{age}= 24.29 months, SD = .85) participated at the 24-month visits, and 170 families (Children: 94 boys, M_{age} = 36.25 months, SD = 1.08) participated in the 36-month visits, either in their child care settings or homes. At 36-months, 109 children were seen in their nurseries, 56 were seen at home, and 5 were seen with their childminder.

Where there was attrition, much was due to families becoming ineligible because they moved away. From 14-months to 24-months, three families were not contactable in time to be seen in the appropriate window, and four families became ineligible. Therefore, there was a 97.4% retention rate, as 193 families were eligible for 24-month visit. At 36-months, four families became ineligible, five withdrew due to time constraints or family tragedies, and seven were not able to be contacted, possibly due to a change of location or

information since the prior visit. There were 189 eligible families, but only the 187 families who completed the 24-month visit were contacted to complete the visit. The retention rate for all families was 89.9%, and the retention rate for families contacted was 90.9%. The number of participants who completed various parts of the study are reported in each of the chapters.

High retention rates may have been due to unique remuneration and several opportunities to learn about the work the study did. At 14- and 24-months, parents were given a small token of gratitude (each participating parent received £15) for participating in observations. At all three time-points children received a small token of gratitude with artwork created specifically for the study. At 14-months, they received a placemat with a picnic scene or a transportation scene, at 24-months, they received a height chart set in the clouds, and at 36-months, they received a poster with an illustrated alphabet. Families were also invited to an annual garden party each year throughout their participation, where they had the opportunity to share their parenting experiences with the other participating families. These garden parties were also an opportunity to share our findings from the study with participating families as well as the general public. Our other ventures to share our research included handing out abstract booklets, frequent newsletters with new study findings and news, and science festival events featuring results from the New Fathers and Mothers Study.

Initial recruitment took place at the hospital, therefore ethical approval for the study was granted by the NHS and Cambridge University for the first two waves. The third wave of the study was added to the overarching design, and so ethical approval was only required from Cambridge University. Parent and teacher information sheets and consent forms are included in Appendix A.

1.8.1. My contribution. My contribution to this study included conducting 186 of the total 551 visits across the three time-points; I was the primary coordinator for 1/3 of the 187 visits at 24-months and all of the 170 visits at 36-months. Coordination involved arranging visits with families and nurseries, as well as following-up about online questionnaires, ensuring all materials were prepared, and scheduling staff to visit families. Creating the protocol for visits, including piloting, for visits was a team effort at each time-point, and required everyone to be involved. For the 36-month visits, I took the lead in compiling information from prior research and pilot visits, under the direction of the Principal Investigator, to create the final protocol. I wrote, amended, and submitted ethics applications to the NHS and University for the 24- and 36-month visits and took responsibility for ensuring ethical guidelines were followed. I assisted in overseeing lab work of 24 high school, undergraduate, and postgraduate interns and 12 master's students; this oversight included training many of them in visit protocol. I was heavily involved in organising and participating in participant engagement activities, including both child-focused events (such as the garden parties) and the more academic events. I was the primary coder for all of the coding involved in the work reported in this dissertation, and I was a coder for several other measures throughout the project.

1.9. Conclusions

In sum, the current project utilises novel methodology and a large multi-method, multi-informant study to examine naturalistic associations between screen time and prosocial behaviour in toddlerhood. Though it is well-established that toddlerhood is critical for prosocial behaviour development and it is becoming more evident that toddlers are engaging with screens, there are several gaps in the

literature surrounding prosocial behaviour and screen time to be addressed. In addition, most of the research about the associations between screen time and prosocial behaviour was undertaken several decades ago, before screen time was as pervasive as it is today. The current study joins an emerging body of more current work to address important questions about whether toddlers are learning prosocial behaviour from the screen time they are engaging with every day.

Investigations of prosocial behaviour and screen time have both relied heavily on lab-based designs. For prosocial behaviour, this unfamiliar setting may restrict children's responses. For screen time, the use of lab-based priming tasks is problematic because it fails to reflect the vast amount of input children experience. In addition, most studies on screen time have relied heavily on one parent's report of a child's screen time, such that issues of reliability are rarely considered. The current study is well-placed to address these methodological concerns and investigate both prosocial behaviour and screen time with a broader brushstroke. First, the naturalistic nature of data collection in homes and nurseries serves to address the concern that children may feel out of place in a lab setting. Second, the inclusion of a technology interview and detailed content coding of programming children watch in their own time allows for a richer understanding of screen time in toddlerhood and allows for more thorough conclusions to be drawn about the associations between screen content and behaviour. Finally, the inclusion of two informants about screen time adds reliability to the screen time measure, as well as more information about the context of children's screen time and whether or not families are following guidelines around screen time, as not every parent will be able to accurately report what a child does with their other parent.

An important pitfall within the literature about the way screen time and prosocial behaviour relate to each other is that most research investigates immediate effects of exposure to screen time. In contrast, in the current study screen time and prosocial behaviour are measured separately and unrelatedly. In addition, the longitudinal design of the current study allows for a deeper understanding of how screen content may be retained and utilised after a gap of time, and how screen time may affect prosocial behaviour longitudinally by taking children away from other activities.

At the same time, the larger framing study also constrained the scope of the current study. Specifically, to reduce burden on families, we were able to ask families to do only a limited amount of reporting on technology use and were only able to include one prosocial task when children were 24-months and two tasks when they were 36-months old. In addition, the sample was recruited to answer a specific set of questions around the transition to parenthood, parental wellbeing, and child adjustment, and so was not necessarily recruited as the most representative sample. The sample was also not representative of the local population, as parents were relatively highly educated and family incomes were generally high. However, these limitations were overshadowed by the advantages of having a large sample willing to be visited at several time points and participate in multi-method research with the whole family.

1.10. Chapter outline

Chapter 2. Though there has been a dip in research in prosocial television over the past several decades, there has been much scholarship on prosocial behaviour. Therefore, the first set of results will examine the prosocial outcome

measures, which will help to put the television coding into perspective. Toddlerhood is key for the development of prosocial behaviour, though there are several key gaps in the literature, especially around empathy measurement in naturalistic settings and over time. In addition, though it has been established that different aspects of prosocial behaviour such as helping, comforting, and sharing are unique and have unique developmental processes (e.g., Paulus, 2014), more research is needed on how empathy and sharing are related in toddlerhood. Thus, building on a growing body of research investigating early prosocial behaviour development, the first part of this dissertation will investigate the development of empathic concern and sharing, and how they relate to each other. Specifically, individual differences in empathic behaviour at 24- and 36-months of age and sharing behaviour at 36-months will be explored. Further, concurrent and longitudinal associations within and between constructs will be examined. Of note, several sections of this chapter have been published in collaboration (McHarg, Fink, & Hughes, 2019), and all work reported in this dissertation were my contributions to the published work.

Chapter 3. Next, capitalising on the longitudinal nature of the data and the inclusion of both mothers and fathers, key questions about what technology use in the home looks like for children in the current sample will be answered. There is a lack of scholarship about what children are watching in their own time (e.g., not in the lab); specifically, how prosocial children's television diets (i.e., the unique set of characteristics associated with the specific set of programmes each child watches) will be examined using a novel coding scheme of programmes parents reported children were watching. Further, this chapter will explore how prosocial content is transmitted through various formal features (e.g., conversational techniques, pacing,

and animation). In addition, the ways children's screen time content experiences differ by gender will be examined. This chapter will also report how prosocial and antisocial parents believed their children's favourite programmes to be and how similar these ratings were to researcher coding. Whether parents are equally good at identifying prosocial and antisocial behaviour and whether parents are able to reliably rate programmes whether or not they tend to watch programmes with their children will be examined.

Chapter 4. In addition, little is known about the quantity and context of toddlers' screen time; these will be addressed next. Although television content is a likely contributor to how screen time affects prosocial behaviour, there may also be a dosage effect of screen time, and screen time itself may have an effect by taking children away from other activities that may promote prosocial behaviour development. Therefore, the next chapter will focus on the quantity of screen time children experienced at 14-, 24-, and 36-months of age. Beyond the amount at each time point, the stability of individual differences in screen time will be reported to investigate how screen time changes over time. The context of screen use will also be examined, including where, when, and with whom children were engaging with screens. Finally, this chapter will explore how parents felt about screen usage at each time point, including how mothers and fathers agreed and differed at each time-point and how these attitudes changed over time. Crucially, this chapter will investigate attitudes around why parents like screen time as well as how parents limited children's screen time. Further, how well parents' limits worked to limit children's screen time will be investigated by looking at whether children who were

given screen time limits by their mothers and fathers watched less screen time concurrently and longitudinally.

Chapter 5. Finally, bringing scholarship on the influences of technology on prosocial behaviour into the 21st century, the final results chapter will ascertain whether screen content and/or screen time influence prosocial behaviour development. Specifically, this chapter will examine whether children's television diets, in both quantity and quality, are related to their prosocial behaviour outcomes. First, direct associations between screen time quantity and prosocial outcomes will be studied. Next whether prosocial content moderates the associations between screen time and prosocial behaviour or if there is evidence for a transfer deficit in social screen time will be examined. Finally, associations between content and format features will be investigated with reference to prosocial outcomes to investigate whether format features can help improve prosocial learning from screen time.

Chapter 6. Finally, the implications of these results will be discussed in a general discussion chapter; in particular, this chapter will consider how these results influence policy-makers, content-creators, and families. Key strengths and limitations of the study will be highlighted in the concluding chapter, as well as recommendations for further research.

Chapter 2. Prosocial Behaviour in Toddlerhood: Empathy and Sharing Behaviour at 24- and 36-months

A large amount of the literature review, method, results, and discussion in sections 2.2, 2.4, 2.5, 2.6, 2.7 (2.7.1-2.7.7), 2.8, 2.9, and 2.14 has been published in collaboration (McHarg et al., 2019). The work reported in this chapter reflects my contribution to the collaborative published work.

Society hinges on people being prosocial toward one another. From sharing resources so that everyone is fed to caring for the young, elderly, and ill to collaborating on large-scale projects to keep society running, prosocial behaviour is fundamental to the way in which we live. Importantly, even if we are hardwired for prosocial behaviour, and even if babies begin laying the ground work for meaningful social interaction in the first hours of life, humans are not born with the ability to walk up to a crying person and comfort them in meaningful ways; years of prosocial development are necessary first. The current chapter discusses typical development of empathy and sharing and utilises novel coding schemes to investigate development of empathy and sharing in toddlerhood, investigating both age-specific patterns and longitudinal associations. In addition, the current chapter examines associations between empathic responding and sharing in toddlerhood.

Prosocial behaviour refers to a wide range of behaviours, including action-based instrumental helping, emotion-based empathic responses, and costly altruistic giving and sacrificing (Svetlova, Nichols, & Brownell, 2010). In the early years of life, prosocial behaviour begins with contagion responses and self-oriented distress (Hoffman, 2000), later followed by spontaneous sharing, assistance, and cooperation, which are subsequently followed by empathic responding (Brownell, 2013; Carpendale, Kettner, & Audet, 2015; Warneken & Tomasello, 2007). It is important to note, however, that the development of

empathic responding, sharing, and helping prosocial behaviours occur independently and uniquely (Paulus, 2014; Schuhmacher et al., 2017); thus, sharing, helping, and empathic behaviour will each be discussed separately.

2.1. Helping

Helping behaviour emerges between 14- and 18-months of age (e.g., Warneken & Tomasello, 2006, 2007, 2009), and has been consistently seen in most children at ages younger than the current sample. Indeed, Warneken & Tomasello (2007) found that 75% of 14-month old children helped at least once in a battery of help-eliciting tasks, and Schuhmacher, Collard, and Kärtner (2017) found that 95% of 18-month-old children helped at least once in a similar battery. In contrast, empathy shows marked developmental change (e.g., Zahn-Waxler, Radke-Yarrow, Wagner, & Chapman, 1992), and empathy and sharing show individual differences (e.g., Brownell & Kopp, 2007; Conte, Grazzani, & Pepe, 2018) across toddlerhood and early childhood. Helping, sharing, and empathy also differ in prevalence amongst young children; indeed, whereas empathy researchers tout the impressive abilities of very young children to alleviate another's distress, research on sharing has established pre-schoolers to be very selfish. Therefore, the current chapter will focus on empathic and sharing behaviour, which are more variable at the target age than helping behaviour. This chapter will investigate the development of empathic and sharing behaviour and the range of individual differences seen in the current sample. In addition, concurrent and longitudinal associations between empathy and sharing will be explored.

2.2. Empathy

2.2.1. Development of empathy. Empathy, a seemingly ubiquitous human quality defined as "an affective response more appropriate to another's situation than one's own," (Hoffman, 2000 p 4) is a precursor to empathic behaviour. Empathic behaviours, which are

responses to empathy, are comforting and helping behaviours designed to alleviate negative affect in another person (Eisenberg et al., 2006) and begin to develop in the second year of life (Hoffman, 2000; Moreno, Klute, & Robinson, 2008; Nichols et al., 2015; Zahn-Waxler & Radke-Yarrow, 1990). However, responding empathically actually begins with neonatal imitative behaviour as early as the first couple of hours of life (Hoffman, 1991, 2000). This seemingly immediate imitative behaviour does not go away, but becomes more regulated throughout development, as people move from motor mimicry (an unconscious match between an observer's feeling and expression with a victim's feeling and expression) and classical conditioning (e.g., when a distressing stimulus makes someone distressed as another person is reacting to distress and so one may be conditioned to feeling distressed when another's face is showing signs of distress) to direct cognitive association of a victim's cues with one's own past experience. Next, children progress to a capacity for mediated association that includes semantic processing of the victim's situation and finally to role- or perspective-taking (Hoffman, 2000). In order to progress through these stages of empathy development, one must have experienced a full range of emotion. This experience helps one appropriately associate another's emotions with a victim's distress and respond in a prosocial way (Hoffman, 2000).

During the second year of life, children become cognitively able to assess why someone is distressed and able to alleviate distress (Brownell, 2013; Nichols et al., 2015; Zahn-Waxler & Radke-Yarrow, 1990). Part of this process is developing self-other differentiation, which provides the capacity to respond and alleviate the distress of others without being overcome by their own distress (e.g., Kärtner, Keller, & Chaudhary, 2010). Further, as children develop their emotion regulation abilities that result in a capability to overcome feelings of distress when someone else is another's distressed, their empathic

responding becomes more prosocial (Garner, 2003; Hoffman, 2000; Zahn-Waxler, Radke-Yarrow, Wagner, & Chapman, 1992). Reflecting this developmental trend, Nichols et al. (2015) reported that just 25% of 18-month-olds, as compared with 67% of 24-month-olds displayed empathic concern for an infant's distress. Further, emotion understanding at age three predicts prosocial behaviour at age four ($\beta = .36$ $p < .01$, model $R^2 = .08$; Ensor, Spencer, & Hughes, 2011). Emotion understanding may contribute to positive social interactions and prosocial caring (Hughes, 2011); therefore, learning about emotions may lead to seeking out social information from others.

Interestingly, when children were around 24-months-old, parents adjusted their socialisation behaviour to reflect these differences; Waugh, Brownell, and Pollock (2015) found parents made requests for helping behaviour based on abstract needs and behaviours by the time their child was two, compared with requests for mostly goal-based help when their children were 18 months old ($F(1, 43) = 3.98$, $p = .052$). This cognitive shift in children and parents highlights the intersection between cognition and prosocial behaviour and the ways in which parental scaffolding and socialisation are child-dependent. Inhibitory cognitive processes may also contribute to prosocial development. Impairments in inhibition and planning may contribute to antisocial behaviour (Hughes, Dunn, & White, 1998; Hughes, White, Sharpen, & Dunn, 2000), suggesting executive functioning may contribute to prosocial ability, or at least inhibit antisocial behaviour.

In addition, empathic concern and other related responses are expected to increase from 24- to 36-months of age. Hoffman (2000) suggests that empathy develops alongside other social-cognitive skills, and thus should improve with age. Supporting this view, Zahn-Waxler et al. (1992) found that empathic concern increased with age at each of three time-points. First, there was an increase between 13- and 15-months of age, then between 18- to

20-months of age, and finally from 23- to 25-months of age. In contrast, Jambon, Madigan, Plamondon, Daniel, and Jenkins (2018) found that mean empathy scores did not differ between 18- and 36-months of age, suggesting the degree to which children, as a group, showed empathy remained unchanged. This study did not, however, investigate individual stability in prosocial behaviour. Based on the bulk of literature, empathic concern should increase; importantly, however, personal distress is expected to decrease as children become older and more capable of regulating their emotions. However, there may be little change in overall group means.

2.2.2. Individual differences in empathy. Individual differences in toddlers' ability to respond empathically to another's distress are theoretically linked with variation in important social skills, such as social referencing and social perspective-taking (e.g., Brownell & Kopp, 2007; Hobson, 2007; Strayer, 1980). However, empathic distress does not always lead to prosocial behaviour. Several processes may interrupt the process of empathic distress becoming empathic concern or comforting. One such process is repression of empathic distress, which may result in ignoring the distress and continuing prior activity. Diffusion of responsibility may also encourage some to not help, and sometimes the cost of help may be discouraging (Hoffman, 2000). In addition, one may be overcome by the distress they feel at another's distress. The current study builds upon a theoretical distinction between two different expressions of empathy in response to another's distress: (i) empathic feeling of concern directed towards the person in distress (Hoffman, 2000); and (ii) personal distress, which may be due to poor emotion regulation, is a self-concerned, aversive response to another's plight that typically leads to attempts to reduce one's own distress rather than the distress of the victim (e.g., Eisenberg, Fabes, & Murphy, 1996). Importantly, as personal distress may occur at some point in a response to another's

distress, personal distress may precede empathic responding, if a child is able to overcome their own distress.

Some aspects of empathy might be present for some children and absent for others. Researchers have highlighted the need to distinguish between cognitive and affective components of empathy (e.g., Vachon & Lynam, 2016). Specifically, affective responses to another's cries might lead some toddlers to engage in prosocial behaviours, but can also constrain prosocial behaviour, resulting in weak or non-significant overall associations with behavioural or cognitive measures of empathy. Indeed, in a study of three- and four-year-old children, Lin and Grisham (2017) found that the relationship between personal distress and empathic concern was only evident for children who showed high levels of cognitive enquiry. This finding not only highlights the importance of cognitive development for empathic concern, but also illustrates that children's characteristics beyond empathic concern may contribute to individual differences in empathic responding.

Moreover, there is relatively strong empirical evidence for associations between individual differences in empathy and individual differences in popularity, friendship reciprocity and social competence in early childhood (e.g., Diener & Kim, 2004; Sallquist, Eisenberg, Spinrad, Eggum, & Gaertner, 2009; Ungerer, et al., 1990; Roth-Hannania, Davidov, & Zahn-Waxler, 2011; Spinrad & Eisenberg, 2017). These associations have prompted investigations of a range of potential influences on early empathy, including intrinsic factors such as temperament (Schuhmacher et al., 2017) and extrinsic family influences (e.g., Hughes, McHarg & White, 2018; Dahl, 2018). Further, positive correlations between empathy and aggression (e.g., Gill & Calkins, 2003) suggest that some aspects of empathy are related to overall social involvement. Based on this work, we hypothesized that individual differences in toddlers' displays of personal distress would be: (a) relatively

independent overall from variation in empathic concern; but (b) associated with empathic concern in the subset of toddlers who were able to provide a cognitive label (e.g., "Baby is sad"). In addition, there are marked individual differences in empathic concern that are related to a number of individual factors, and we expect that individual differences will be stable across the year.

Individual differences may be further implicated by gender. Gender differences in empathy have been found to be significant, and have been reported in both humans and non-human species (Christov-Moore et al., 2014), beginning early in life. Specifically, compared with infant boys, infant girls showed higher skills in both recognizing non-verbal emotions and facial expressions (for review, see Christov-Moore, et al., 2014), and by primary school age, some studies have shown gender differences (e.g., Catherine & Schonert-Reichl, 2011). However, investigations of gender differences in toddlers' responses to empathy-eliciting situations have produced mixed findings. For example, Spinrad and Stifter (2006) found that while girls were more likely than boys to display concern toward a distressed stranger ($t = 2.28$, $p < .05$), there were no gender differences in toddlers' behavioural responses to either a crying baby doll or mothers feigning an injury. In contrast, Nichols et al (2015) found that girls showed more positive social interest in a crying baby than did boys, regardless of whether the baby was crying or cooing ($F(1, 64) = 4.05$, $p < .05$). Similarly, Blandon and Scrimgeour (2015) found that even at 15 months of age, and when children were three-years old, girls were mildly more concerned for their peers than boys. Further, in a study of 584 twins aged 19- to 25-months, Volbrecht, Lemery-Chalfant, Aksan, Zahn-Waxler, and Goldsmith (2007) found that girls were more likely to display concern than boys, however this effect was only marginally statistically significant ($F(1, 259) = 3.42$, $p = .07$). Importantly, mean levels of cognitive empathy were similar for boys and girls. In

contrast, Lin and Grisham (2017) found no gender differences in three-year-old children's responses to a crying baby. Building on this prior work, the current study will examine whether effects of child gender vary in magnitude across different features of empathic responses, and at different ages.

2.2.3. Measurement of empathic concern. Surprisingly few investigations have examined children's responses to another child's distress in naturalistic or quasi-naturalistic settings. The current study utilises a Crying Baby Paradigm to elicit empathic behaviour. Though older children have been observed responding to baby cries coming from another room (e.g., Eisenberg, Fabes, & Murphy, 1996), previous studies of toddlers' empathic responses have typically relied on simulations of distress by a parent or experimenter in a lab context and therefore have questionable ecological validity. An exception is Spinrad and Stifter's (2006) investigation of the responses of 18-month-olds who, accompanied by their mothers, witnessed a life-like baby doll crying via a speaker in the arms of his or her caregiver. Building on this work, Nichols et al. (2015) and Lin and Grisham (2017) investigated the responses of children aged 12- to 36-months to a similar crying baby paradigm administered in the lab, without the baby's caregiver. The current study aims to increase ecological validity by using a similar distress paradigm in children's familiar settings – at home and/or their child-care settings. To do this, children were seen in their home with their parents at 24-months of age, and then either in nursery or at home at 36-months of age. Each of these scenarios might be familiar places to hear a baby cry, and so, we expect responses to be representative of genuine empathic behaviour. In addition, by using the same measure at two time points, some validation is added to the relatively novel measure.

2.3. Sharing

2.3.1. Development of sharing. Along with empathy, sharing resources is a vital part

of play and friendship interactions. Brownell et al. (2013) found that 24-month old children shared more quickly and more often than 18-month old children; this trajectory is markedly later than that of helping behaviour. One contribution to this later onset may be understanding of ownership. By age two, toddlers do seem to have some awareness of ownership, and have shown the ability to share well in toy-sharing games (Brownell, et al., 2013). Indeed, 18- to 30-month old toddlers who used possessive pronouns during a home-visit were moderately, though significantly (r = .28, p < .05), more likely to share with their peers when they were followed up six months later (Hay, 2010). However, this does not always translate into practice; in contrast to seven- and eight-year old children, three-year-old children said that they *should* share, but did not share when given the option (Smith, Blake, & Harris, 2013).

Sharing is especially difficult for young children, and indeed older children and adults, because it requires one to give something up to benefit another (Brownell, Iesue, Nichols, & Svetlova, 2013). Strikingly, in a study of three- to four-year-old-children, only 8.7% of children were willing to share their sweets with an anonymous partner (Fehr, Bernhard, & Rockenbach, 2008). Sharing also occurs less frequently than helping or comforting behaviours in four- and seven-year old children (Grusec, 1991). Researchers in the field have, however, shown some selflessness in early childhood; in a study of four-year-old children, levels of sharing behaviour that were in line with adult sharing (sharing 20%-30% of their sticker resources) was seen (Benenson et al., 2007). In addition, when dividing rewards between themselves, 18- and 24-month old children acted fairly, producing even splits 58% of the time, and "selfish divisions" only 19% of the time (Ulber, Hamann, & Tomasello, 2015). Interestingly, children were more likely to share them equally when they worked for the rewards collaboratively rather than separately (Ulber, et al., 2015),

suggesting that an atmosphere of collaboration and friendship encourages sharing. Indeed, 22% of three-year-old children kept more stickers for themselves when they contributed more than a puppet-partner during a game, and kept fewer stickers when they had contributed less, and a total of 44% of three-year-olds shared with a pattern that indicated a consideration of merit (Kanngiesser & Warneken, 2012). Thus, it does appear that children are able to share, and they do so differently depending on context, but there is no clear consensus on how much is common or likely in very young children.

2.3.2. Individual differences in sharing. The literature on individual differences in sharing is also inconclusive, though variation has often been reported. Variation in social understanding may account for differences in sharing, as understanding another's feelings and desires may help children understand the benefits of sharing. Indeed, Conte, Grazzani, and Pepe (2018) found that, in a model including emotion knowledge, theory of mind, and language, both theory of mind (b = .93, p = .036) and language (b = .042, p = .019) were positively related to sharing in 24-47 month-old children (M_{age} = 35.6 months). A similar effect of theory of mind was found in a sample of Chinese children, for whom theory of mind was related to more sharing with strangers, but not with friends (Yu, Zhu, & Leslie, 2016). Sharing requires some degree of working memory and planning, thus executive functioning may also be related to sharing. Nilsen and Valcke (2018) found that three- to six-year-old children with better executive functioning skills shared more than those with less adept executive skills. This was, however, only true for the younger group of children in their study; it did not hold true for seven- to nine-year-old children. This difference may be due to a reliance on certain aspects of executive functioning for sharing that are not intact for all three- to six-year-old children, but that are typically present in most older children. It could also be that by this older age, sharing is so strongly socialised that it is no longer about

children's own individual characteristics. In contrast, Liu et al. (2016) found no significant relationships between theory of mind or inhibition with sticker sharing with an anonymous partner in their sample of 3-5-year-old children. In sum, pre-school children do appear to have the ability to share and often do, but the mechanisms underlying individual differences remain unclear.

In contrast to empathy, but in line with the literature on general prosocial behaviour, the majority of studies that have investigated sharing in young children have found no gender differences (e.g., Brownell, Iesue, Nichols, & Svetlova, 2013; Newton, Thompson, & Goodman, 2016; Pettygrove, Hammond, Karahuta, Waugh, & Brownell, 2013; Gross, Drummond, Satlof-Bedrick, Waugh, Svetlova, & Brownell, 2015, Smith, Blake, & Harris, 2013) . One early study (Burford, Foley, Rollins, & Rosario, 1996) did find that girls were more likely to share than boys, but this has not been replicated. However, under certain conditions, gender differences emerge. Fehr, Bernhard, and Rockenbach (2008) asked children to share with in-group and out-group members. For girls, there was little difference in sharing between groups. In contrast, boys were more likely to make egalitarian choices with out-group members than in-group members. In addition, when five- to six-year-old children watched a sad video clip and then had the opportunity to share, boys shared less than the boys in a control condition, and girls shared equally as well (Guo, He, & Wu, 2019). These findings suggest that, though in typical sharing situations there were no gender differences, when the situation was manipulated such that the recipient's characteristics were made distinct or the child's emotional state was altered, boys were more susceptible to that manipulation.

2.3.3. Measurement of sharing. Studies of sharing often use sticker/resource-sharing or dictator-game measures to elicit sharing in toddlers (e.g., Beneson, Pascoe, &

Radmore, 2007; Williams, O'Driscoll, & Moore, 2014). These are useful paradigms, as they do not require a physical recipient, and they are relatively controlled, unlike naturalistic observations that may be used where sharing may occur spontaneously in a variety of contexts. The current study utilises a simple sticker-sharing paradigm to investigate individual differences in children's propensity to share when they are 36-months of age.

2.4. Multiple facets of prosocial behaviour

Though the multiple types of prosocial behaviour are unique and independent (e.g., Paulus, 2014), sharing and empathic responses are related. In one study of 50 five- to six-year-old children and 50 three-year old children, empathic concern was related to more prosocial resource allocations (Williams, O'Driscoll, & Moore, 2014). In this study, empathic concern was induced by asking children to focus on the protagonist's feelings and how her story made them feel prior to being shown a sad video. Sharing was then measured with a sticker-sharing task in which the shared stickers were put aside for a protagonist of the video. There was a significant effect of emotion induction condition for the older children (η_p^2 = .078) and the younger children (η_p^2 = .125) such that children in the emotion condition shared more than children in the control condition. Nevertheless, it is important to note that empathic concern was primed through an instructed focus on feelings and sharing was directly related to the priming material. Encouragingly, Paulus and Leitherer (2017) found a positive association between the two constructs when tested separately; regression analyses showed that the participating five-year-old children's prosocial behaviour toward a distressed other explained 7.2% of the variance in charitable sharing, further illustrating the association between the empathic behaviour and sharing. However, empathic responding to an adult in distress was tested prior to sharing, which may have affected participants' emotional states. In addition, the sharing task involved sharing with

either visibly wealthy or poor recipients, which is not as straightforward as sharing with an anonymous recipient and may have been particularly susceptible to any emotional carryover from the empathy measurement. The current study measured empathic concern and sharing separately, the former at two time points. In light of the connectedness of the studies that have found associations between the constructs, and taking into consideration findings that suggest sharing happens less than empathic responding in childhood (Grusec, 1991) and the different developmental pathways involved in each (e.g., Dunfield, 2014), little to no association is expected between empathic concern and sharing in the current study.

2.5. Current study

There are several gaps in the literature around individual differences in empathic responses and sharing, and in longitudinal empathy research that includes the same construct to be addressed. The current study aims to address these gaps, asking three main questions:

1. How do individuals vary in their empathic responses to a distressing event at 24- and 36-months and in their sharing at 36-months?

2. how are children's responses to a distressed peer related longitudinally from 24- to 36-months of age?

3. how are empathic responses and sharing related concurrently and longitudinally?

Method

2.6. Participants

Of the 187 families who completed the observations for the 24-month wave of the NewFAMS, 15 were unable to complete the crying baby paradigm during the visit due to time constraints and data from a further 10 families were lost as a result of technical

difficulties (i.e., Bluetooth recording played infant crying for less than 50 seconds, toddler's face not visible on video). Families that did / did not complete the crying baby paradigm did not differ with respect to average toddler age or parental income, *p*s ≥ .12, but mothers of participating toddlers were, on average, significantly older (*M* = 32.57 years, *SD* = 4.42) than mothers of non-participating toddlers (*M* = 30.73 years, *SD* = 3.42), *t*(185) = -1.990, *p* = .048, *d* = .47. With respect to toddler language ability, t-tests revealed significantly higher expressive language scores in toddlers who did participate in the crying baby paradigm (*M* = 58.80, *SD* = 21.94) than in toddlers who did not participate, (*M* = 47.86, *SD*= 27.24) *t*(178) = -2.124, *p* = .035, *d* = .44.

Of the 162 who completed the CBP, six children were under 23-months of age, and, given the well-documented rapid language development at this age, we removed those six cases from the current analysis. The remaining children's ages ranged from 23.26 months to 26.97 months, M_{age} = 24.35 months, *SD* = .73. Detailed coding of toddlers' and parents' actions during the crying baby paradigm was completed for the remaining 156 families (41 mother-daughter dyads, 46 mother-son dyads, 27 father-daughter dyads, 42 father-son dyads).

Of the 170 children who completed the 36-month visit (see introductory chapter for retention information), 108 children completed the crying baby paradigm (62 children were seen in a setting where video recording did not comply with regulations). 13 cases were removed due to technical difficulties. An additional nine cases were removed because a caregiver prompted child responses to the crying baby. Therefore, a total of 86 cases (45 boys, M_{age} = 36.23, SD = 1.04) have been included in analysis; 35 of these children were seen at home, 48 at nursery, and 3 at their childminders'. For children visited at 36 months, there were no significant differences in maternal age at birth, paternal age at birth, concurrent

household income, or toddler age at the time of visit for those who did or did not complete the Crying Baby Paradigm, *p*s ≥ .25. Due to the large proportion of missing data and the specific situation in which data was likely to be missing (i.e., in nursery settings), multiple imputation was not used to account for missing data (Jakobsen, Gluud, Wetterslev, & Winkel, 2017). There was no difference in mean age between children who did the Crying Baby Paradigm at home (M_{age} = 36.26, *SD* = 1.12) or in a childcare setting (M_{age} = 36.22, *SD* = 1.00) *t*(84) = .181, *p* = .857. Child expressive language was not collected when children were 36 months old. 69 children who did the crying baby paradigm at both 24-months and 36-months had usable data at both time points.

154 children participated in the sticker-sharing paradigm at the 36-month visit; 17 cases were removed due to fewer than or more than 10 stickers being administered. There were no significant differences in maternal age at birth, paternal age at birth, concurrent household income, or toddler age at the time of visit for those who did or did not participate in the sticker sharing paradigm, *p*s ≥ .23. There was no difference in mean age between children who did the Sticker Sharing Paradigm at home (M_{age} = 36.24, *SD* = 1.21) or in a childcare setting (M_{age} = 36.30, *SD* = 1.06), *t*(134) = -.258, *p* = .797.

2.7. Measures

2.7.1. Crying baby paradigm. An adapted version of Nichols et al.'s (2015) infant distress paradigm was used at the 24-month visit. A life-like baby doll (see Image 2.1) was introduced to the toddler by a researcher and put down "for a nap" near the play area, but out of the way of the interaction. The location of the doll varied by room set-up, but the doll was always far enough away that a child would have to actively approach it to see it better and/or to act in a prosocial manner toward it. The doll was introduced as 'George' if the child being observed was a boy, and as 'Charlotte' if the child being observed was a girl.

After a book-reading task with the one parent (counterbalanced between parents), the baby cried via a Bluetooth speaker. Although played through a speaker, this 'cry' was a recording of an actual baby in distress. Parents were instructed to respond to their toddlers' interest – to ignore the baby if their child ignored it, but talking about the baby, why it might be crying, and what the toddler might do to help the baby, if the toddler showed interest. At the 36-month visit, where recording was permitted, the researcher entered the testing session with the baby in a sling to increase ecological validity, and, after being introduced as George or Charlotte, was put down in a cot. In the middle of the visit, during a free-play 'break' from the rest of the testing session, the researcher began the recording of the crying baby using Bluetooth technology, allowing the sound to come from the cot near the baby's head, whilst the researcher was turned away from the baby and child. Any adults in the room were instructed to ignore the baby's crying, and to not engage with the child about the baby. Researchers remained in the room with the child during the crying baby task, but looked busy with paperwork. If the child tried to get the researcher's attention about the baby, researchers said "I'm doing paperwork right now," and did not engage further. After the baby finished crying, children were reassured that the baby was alright.

Image 2.1. The life-like baby doll in the crying baby paradigm

Toddlers' responses were coded with an adapted version of the coding scheme Nichols, Svetlova, and Brownell (2015) used of passive attention, active interest, positive social expression, distress and concern to reflect our focus on individual differences (rather than contrasts between age groups) and to include parental responses. After conducting detailed behavioural coding based on the Nichols et al. coding scheme, toddler responses grouped together differently than in the Nichols et al. (2015) study, and three composite scores were created that differed from the ones reported therein:

Attention: A mean score of standardised directed attention (proportion time spent looking at the baby and proportion of time spent not engaged in picture book reading (24-months) or toy play (36-months)) and standardised active attention (frequency of pointing to or labelling the baby and whether or not the toddler approached the baby).

Emotion labelling: A categorical variable indicating whether or not the toddler labelled the baby's emotional state (saying things such as 'baby is sad' or 'baby wants mummy').

Prosocial acts: A categorical variable indicating whether or not the toddler spontaneously helped the baby (e.g., stroking or offering the bottle/rattle).

In addition, using Nichols et al.'s coding scheme, two overall global scores were given:

Personal distress: This scale included affective or behavioural indications of anxiety, agitation, tenseness, discomfort, sadness, desire for contact with or comfort from parent, fear, or worry that was not focused on the baby. Toddlers were rated on a 0- to 3-point global score (0 = no distress, 1 = fleeting distress, 2 = moderate distress, 3 = strong distress).

Empathic concern: An overall score of toddlers' concern for/about the baby coded

on a 4-point scale (0 = no empathic concern for the baby, 1 = mild empathic concern for the baby, 2 = moderate empathic concern for the baby, 3 = strong empathic concern for the baby). To achieve the maximum score, toddlers needed to show a spontaneous prosocial act accompanied by displays of urgency or insistence in helping the baby and/or concern about the baby. Empathic concern was coded based on children's actions without encouragement from parents.

To establish inter-rater reliability for 24-month codes, I and an undergraduate coder independently coded 20% of the videos. All coding was done at the most fine-grained level before creating dichotomous variables, so intra-class correlations (ICCs) were calculated for both coders' codes of frequencies of behaviours and codes on the behavioural scales. For toddler codes, the average ICC was .88, with individual ICCs ranging from .76 to .97. For parent codes, the average ICC was .87, with individual ICCs ranging from .77 to .99. At 36-months, I and two undergraduate students coded 30 videos. For child codes, the average ICC was .93, with individual ICCs ranging from .72 to .99.

2.7.2. Child language. One parent (counterbalanced across parent gender) completed the infant short version of the MacArthur Communicative Development Inventories (Fenson et al., 2000) to assess child language ability at the 24-month visit. This measure asked parents to identify whether the child understood or understood and said 90 common vocabulary words (e.g., ouch, choo choo, cup). We added the word 'daddy' to the 89-item infant questionnaire, which was used at multiple time points throughout the larger longitudinal study. The total number of words from the list children said was calculated as a measure of the child's expressive vocabulary.

2.7.3. Sticker sharing paradigm. At the end of the 36-month visit, children were invited to participate in a sticker-sharing paradigm (adapted from Beneson, Pascoe, &

Radmore, 2007). Children received ten gender-neutral stickers and were told, “There is a little [boy/girl to match child’s gender] at another nursery who couldn’t play with us today. You can give some of your stickers to him/her, if you’d like. This yellow envelope is your envelope. Whatever you put in this envelope, you get to keep. This green envelope is for the little [boy/girl] from the other nursery. Whatever you put in this envelope will go to [him/her].” After ensuring the child understood which envelope was for him/her and which was for the other child, the researcher either turned around or left the testing area to allow the child to share the stickers without being watched. How many stickers the child kept and how many the child shared were recorded.

2.8. Analysis Plan

Analyses were carried out to reflect the key questions, first for empathic behaviour, then for sharing behaviour, and, finally, for associations between the two. First, toddler and child responses to the crying baby paradigm at each age were examined, beginning with descriptive analyses to investigate whether and how children typically responded to the crying baby at different ages. Further, gender differences at each time point were examined. At age 24-months, expressive language ability was controlled, since some of the responses require a good handle on language, which is variable in the second year of life.

Second, focus turned to longitudinal associations between responses during the crying baby paradigm at each time point. Simple correlations between toddler responses at 24-months and child responses at 36-months were run, followed by partial correlations, controlling for the location of the 36-month visit, as children may have responded differently in different locations, and the 24-month visits were all done at home. Gender differences have been shown to vary by age, so repeated measures ANCOVAs were run with gender as the grouping variable, covarying for the location of the second visit.

Third, descriptive statistics and t-tests for gender and location differences were run for the sticker-sharing paradigm. Following that, concurrent and longitudinal correlations were run looking at the association between empathic concern and responding and sharing, looking at both bivariate associations and controlling for location of the 36-month visit (home or away from home). Linear regressions with sharing as the dependent variable were conducted, including gender and location of visit in the first step, significantly related measures from the 24-month crying baby paradigm in the second step, and, finally, significantly related measures of the 36-month crying baby paradigm.

Results

2.9. The crying baby paradigm at age 24-months

As shown in Table 2.1 and Figures 2.1-2.2, the majority of toddlers responded in some way to the crying baby when they were 24-months old. Those who did not, simply carried on engaging in book reading with their parent. Specifically, 88 toddlers (69.8%) looked at the baby, pointed to the baby, approached the baby, and/or stopped playing, showing an attentional response for at least half of the crying period; 108 (68%) displayed at least fleeting distress (scored 1 or above) and 62 (39%) displayed either moderate or strong distress in response to the crying baby. In addition, 71 toddlers (44%) provided an emotion label when reacting to the baby (e.g., labelling the baby as ‘sad’). However, just 23 toddlers (14%) spontaneously displayed a prosocial act, such as offering a toy to the baby or patting the crying baby.

Table 2.1. Descriptive statistics for children's responses to the crying baby at each time point.

	24-Months			36-Months		
	All	Boys	Girls	All	Boys	Girls
Emotion Labelling	0 = 56% 1 = 43%	0 = 66% 1 = 33%	0 = 42% 1 = 57%	0 = 75% 1 = 24%	0 = 81% 1 = 18%	0 = 68% 1 = 31%
Spontaneous Prosocial Behaviour	0 = 86% 1 = 13%	0 = 86% 1 = 14%	0 = 86% 1 = 13%	0 = 88% 1= 11%	0 = 88% 1= 11%	0 = 87% 1 = 12%
Expressive Language	M = 58.01 SD = 22.80	M = 56.04 SD = 21.92	M = 68.52 SD = 21.06	n/a	n/a	n/a
Child Age	M = 24.38 SD = .74	M = 24.38 SD = .71	M = 24.31 SD = .75	M = 36.25 SD = 1.04	36.33 1.02	36.12 1.05

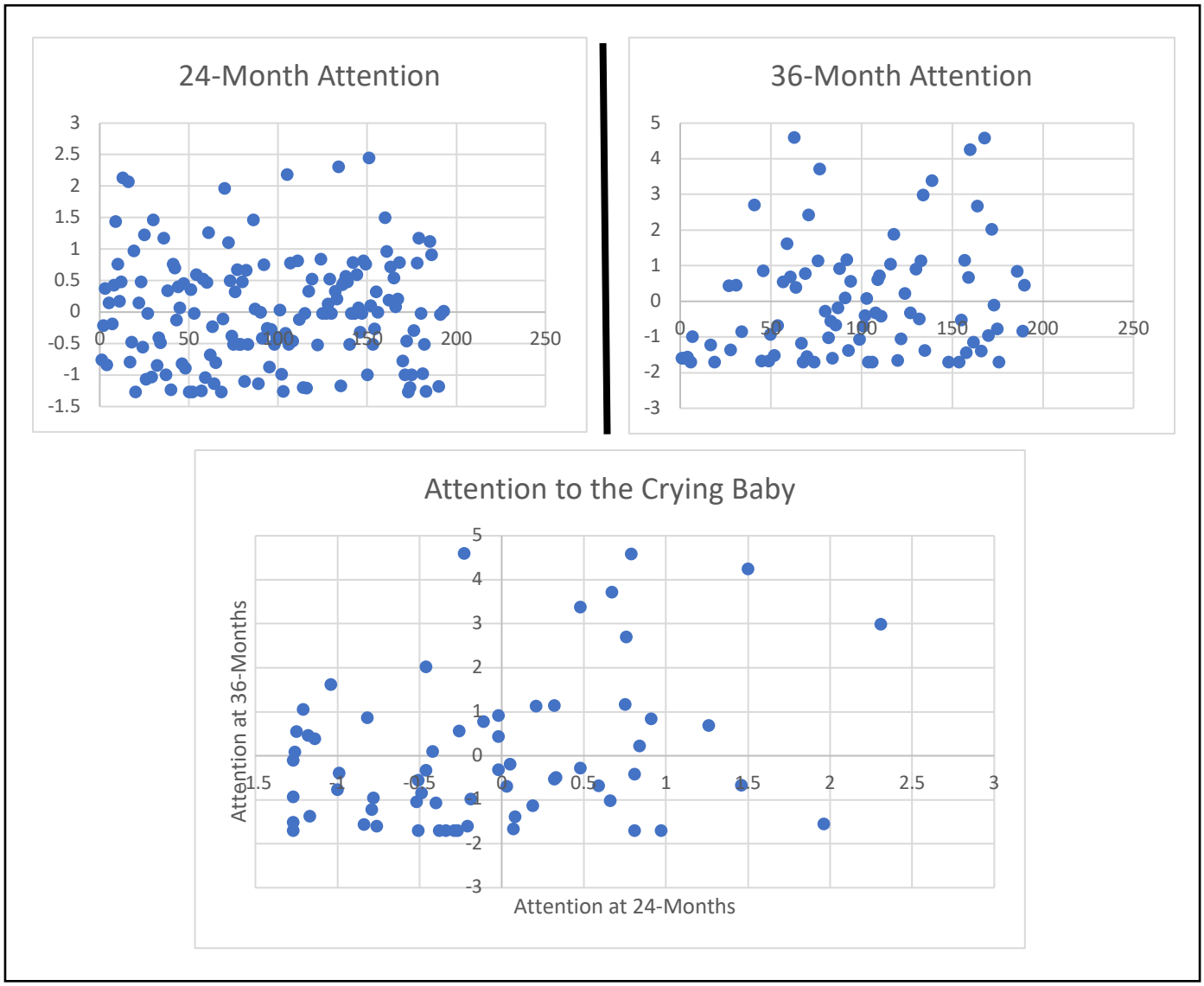


Figure 2.1. Attentional Responses at 24- and 36-Months – most children attended to the baby at each time point, but attended less at 36-months.

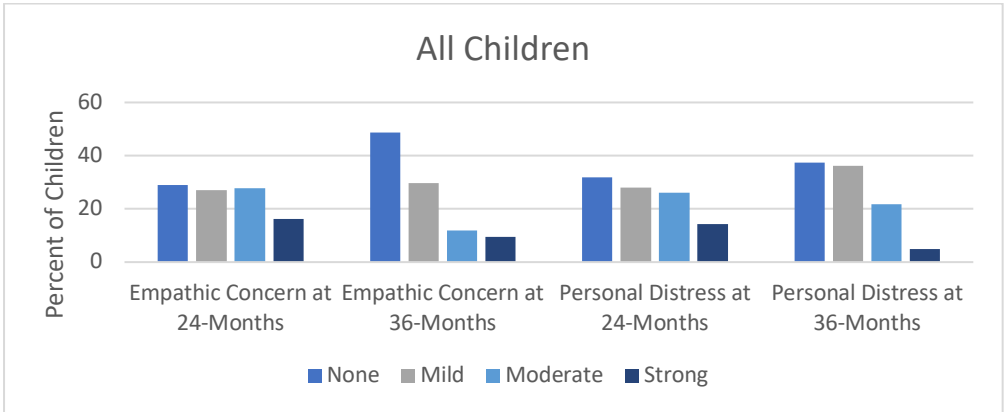


Figure 2.2. Personal Distress and Empathic Concern both decreased between 24- and 36-months.

As illustrated in Table 2.2, the different toddler responses showed several noteworthy associations and non-significant associations. First, attention toward the crying baby was positively associated with emotion labelling, prosocial behaviour and scores for both empathic concern and personal distress. Second, personal distress was not significantly associated with empathic concern, but was negatively correlated with prosocial behaviour. As expected given the coding overlap, prosocial behaviour and empathic concern were also significantly positively correlated. Third, toddlers who provided an emotion label were more likely to behave in a prosocial manner toward the baby and were rated as showing greater empathic concern.

Table 2.2. Pearson correlations for children's responses to the crying baby at each time point.

	24-Months (N = 156)					36-Months (N = 85)			
	1	2	3	4	5	1	2	3	4
1. Attention	-					-			
2. Emotion Labelling	.341**	-				.365**	-		
3. Spontaneous Prosocial Behaviour	.247**	.178**	-			.535**	.299**	-	-
4. Empathic Concern	.550**	.531**	.582**	-		.553**	.527**	.744**	-
5. Personal Distress	.295**	.043	-.162*	.043	-	.170	-.149	.017	-.068
6. Expressive Language	-.004	.216**	.100	-.049	.074	-	-	-	-

*p<.05, **p<.01

Confirming that emotion labelling requires some language competence, independent samples *t*-test showed significantly higher mean expressive language scores for toddlers who provided an emotion label (M = 64.82) than for those who did not (M = 55.38), $t(149) = 2.70$, $p = 0.008$, $d = .45$. Independent samples *t*-tests, used to compare boys' and girls' responses to the crying baby paradigm, showed no mean gender differences in toddlers' attention, empathic concern and personal distress, $ts \leq .92$, $ps \geq .366$. Likewise, Chi-squared tests showed that similar proportions of boys and girls (14% and 13%,

respectively) were categorised as displaying a spontaneous prosocial response, $\chi^2 = .017$, $p = .545$. However, girls were more likely than boys to provide an emotion label for the crying baby (57% girls vs 33% boys), $\chi^2 = 8.94$, $p = .003$, $\phi = .240$, $p = .003$. When toddler expressive language was included in a logistic regression with emotion labelling as the dependent variable and gender and expressive language as predictors, model $\chi^2 = 15.49$, $p < .001$, Nagelkerke $R^2 = .131$, independent predictive effects were found for both gender, $B(1, 149) = .982$, $p = .005$, and expressive language, $B(1,149) = .019$, $p < .001$.

2.10. The crying baby paradigm at age 36-months

As shown in Table 2.1 and Figures 2.1-2.2, the majority of children responded in some way to the crying baby at 36-months. Specifically, 88 children (88.9%) looked at the baby, pointed to the baby, approached the baby, and/or stopped playing at some point during the baby's crying episode. Furthermore, 52 children (63%) displayed at least fleeting distress (scored 1 or above) and 22 (27%) displayed either moderate or strong distress in response to the crying baby. In addition, 43 children (51%) showed at least some empathic concern. However, only 10 children (12%) provided an emotion label when reacting to the baby (e.g., labelling the baby as 'sad'), and just 21 children (25%) spontaneously displayed a prosocial act, such as offering a toy to the baby or patting the crying baby.

As illustrated in Table 2.2, children's different responses were related in interesting ways. First, attention, emotion labelling, prosocial behaviour, and empathic concern were all significantly, positively related to each other. Second, personal distress was not significantly associated with any other child responses. The patterns of associations did not change when partial correlations controlling for whether children completed the paradigm at home or at nursery/with the childminder.

Independent samples *t*-tests showed no significant differences in personal distress or empathic concern between those who completed the paradigm at home compared to at a nursery setting, *t*s $\leq$ .1.02, *p*s $\geq$ .312. There was a marginally significant difference in children's attention based on where the testing session took place, $t(81) = 1.91$, $p = .060$, $d = .42$ ($M_{home} = .369$, SD = 1.82, $M_{away} = -.3035$, SD = 1.39). Chi-squared tests showed no significant differences in emotion labelling or prosocial behaviour for those who had the visit at home or away from home, *p*s $\geq$ .489.

Independent samples *t*-tests were also used to compare boys' and girls' responses to the crying baby paradigm. These showed no mean gender differences in toddlers' attention, empathic concern and personal distress, *t*s $\leq$ .92, *p*s $\geq$ .361. Likewise, Chi-squared tests showed that similar proportions of boys and girls (11% and 12%, respectively) were categorised as displaying a spontaneous prosocial response, $\chi^2 = .014$, $p = .905$, and similar proportions of boys and girls (18% and 32%, respectively) verbally labelled the baby's emotion, $\chi^2 = 2.09$, $p = .149$.

2.11. Crying baby paradigm over time

Empathic responding and concern did show some stability over time. Table 2.3 displays results of Pearson correlations. Of note, empathic concern appears to be stable over time, $r(65) = .318$, $p = .009$, as does prosocial behaviour, $r(66) = .235$, $p = .054$, though the latter association was marginally significant only. Prosocial and empathic responses at 24-months of age significantly predicted children's attention to the crying baby at 36-months, and higher empathic concern at 24-months was related to prosocial behaviour at 36-months, however this association was marginally significant. Further, children who labelled the baby's emotion at 24-months were more likely to be concerned at 36-months.

When partial correlations were run, controlling for the location of the 36-month visit, patterns remained largely the same, but the associations between early and later prosocial behaviour, $r(57) = .253$, $p = .047$, and early empathic concern and later prosocial behaviour, $r(57) = .270$, $p = .034$, became significant. The association between prosocial behaviour at 24-months and empathic concern at 36-months became stronger, $r(57) = .240$, $p = .060$. In addition, new associations emerge with attention at 24-months, such that children who paid more attention to the baby at 24-months also paid more at 36-months, $r(57) = .294$, $p = .021$, engaged in more prosocial behaviour at 36-months, $r(57) = .242$, $p = .058$, and were more empathically concerned about the baby at 36-months, $r(57) = .260$, $p = .041$.

Table 2.3. Pearson correlations for toddlers' responses to the crying baby between time points.

	24-Month Behaviour				
36-Month Behaviour	1	2	3	4	5
1. Attention	.091	-.019	.097	-.009	.123
2. Emotion Labelling	.147	.166	.212	.082	.241+
3. Spontaneous Prosocial Behaviour	.361**	.078	.235+	.025	.217
4. Personal Distress	-.038	.000	.000	-.035	.116
5. Empathic Concern	.303*	.090	.234+	.065	.318**

+ p<.06, *p<.05, **p<.01

Repeated measures ANCOVAs, covarying for the location of the 36-month visit, revealed a marginally significant effect of gender on empathic concern, $F(1, 85) = 3.842$, $p = .054$, $\eta_p^2 = .057$, and a significant interaction of time and gender on emotion labelling, $F(1, 85) = 5.947$, $p = .018$, $\eta_p^2 = .085$. Further exploration of these results led to running partial correlations (controlling for location of visit) between time points for emotion labelling and empathic concern separately for boys and girls, neither of whom showed a significant

association between emotion labelling at 24-months and emotion labelling at 36-months. In contrast, empathic concern was related between time points for only boys, $r(26) = .519$, $p = .003$; for girls, $r(25) = .112$, $p = .555$. However, the difference between these two correlations was not statistically significant, $z = 1.65$, $p = .099$.

2.12. Sticker sharing paradigm

Children did share their stickers at 36-months, though the range of sharing did span the possible 0-10 shared, and 30 children (22%) shared 0 stickers and only 9 (7%) shared all 10. The mean number of stickers shared was 4.23, *SD* = 3.20. Independent *t*-tests revealed that there was no significant difference in the amount of sticker shared as a function of where the visits took place, $t(135) = 1.45$, $p = .149$. Boys (M = 4.86, SD = 2.40) shared significantly more stickers than girls (M = 3.54, SD = 2.83), $t(135) = 2.46$, $p = .015$, $d = .42$.

2.13. Sharing and empathic responding

Pearson correlations revealed only one significant association between sticker-sharing and the crying baby paradigm: emotion labelling at 24-months was inversely related to more sticker sharing at 36-months, $r(113) = -.203$, $p = .029$. In addition, lower empathic concern at 24-months was marginally significantly related to more sticker sharing at 36-months, $r(114) = -.178$, $p = .056$. No concurrent associations were even marginally significant (conceptualised as below .06; $ps \geq .084$). When controlling for the location of the visit, the inverse association between sticker-sharing and emotion labelling at 24-months remains significant, $r(107) = -.202$, $p = .033$, and the association between empathic concern at 24-months and sticker-sharing becomes significant, $r(107) = -.228$, $p = .016$.

In a linear regression predicting sticker sharing, in which the first step, $R^2 = .104$, included gender and location of the visit, only gender was related to sticker sharing, $\beta = -.321$, $p = .022$. When attention, emotion labelling, prosocial behaviour, and empathic

concern during the crying baby paradigm at 24-months were added to the model, R^2 improved by .124, and gender became a non-significant predictor. No other predictor was significant. Since there were no associations between measures in the 36-month crying baby paradigm and sticker-sharing, no third step was put into the regression.

Discussion

Addressing each research question, three sets of findings emerged. First, detailed behavioural coding of 24-month-old and 36-month-old children's responses to the crying baby paradigm at home and/or in a nursery-type context revealed a range of individual differences in responding, with fewer responses emerging at 36-months. In addition, there was some stability in empathic concern across the year. Second, sharing at age 36-months showed marked variation, and boys shared more stickers than girls. Finally, sticker-sharing and empathic concern appeared to be distinct from each other concurrently, but, there were some weak inverse associations with early empathic behaviour. Each of these sets of findings will be discussed in turn.

2.14. Toddler responses during the crying baby paradigm

2.14.1 Responses to the crying baby at 24-months. First, behavioural coding of toddlers' attentional, emotion labelling and prosocial behaviour demonstrated striking individual differences in toddlers' responses to the Crying Baby Paradigm in the presence of their parent at 24-months. As expected, toddlers' responses to the baby were grouped such that a toddler who attended to the crying baby was also more likely to label the emotion of the baby, show a spontaneous prosocial response and express empathic concern. Personal distress was unrelated to these other behaviours, suggesting that distress does not reliably increase or decrease the likelihood of any of the other child behaviours. This pattern of responses echoes Lin and Grisham's (2017) conclusion that helping actions in response to a

crying baby were motivated by the interaction between empathic concern and cognitive exploration in 36-month-old children. Unlike Lin and Grisham however, the current study did not find any interaction effects between children's behavioural responses. The most likely reason for this contrast hinges on the age difference between the two study samples: at 24-months, some but not all toddlers were able to label the baby as sad, and none was able to formulate a question about *why* the baby was feeling sad, although a small number of toddlers offered explanations such as 'wants mummy' or 'hungry.'

The current findings, by investigating individual differences in responses and how responses emerged together or separately, expand on Nichols et al.'s (2015) findings. In the prior study, 24-month old toddlers were more responsive to the baby than younger children. Specifically, the range in toddler responses (and their interplay) in the current study, demonstrates that emotion regulation and empathic responses were still very much nascent at 24-months (e.g., Brownell, 2013). Indeed, Spinrad and Stifter (2006) found that concerned awareness in 18-month old infants was related to prosocial behaviour with their mothers, but only to personal distress in response to the crying baby. Our results show that individual differences in empathic responding are detectable by 23 months of age.

Strengthening findings from previous studies (e.g., Cole, Michel, & Teti, 1994; Eisenberg, Fabes, Murphy, et al., 1996; Fink, Heathers, & De Rosnay, 2015), the current study found that toddlers' empathic concern and personal distress emerged as distinct responses. That is, while some toddlers appear able to manage their own affective response and respond in a concerned way, for others, the experience of distress becomes overwhelming and impedes any interaction with the crying baby. Indeed, the distinctness of these constructs highlights that some children displayed both personal distress and empathic concern. This finding highlights the developmental work involved in learning to

overcome one's own distress in order to empathically respond to another in distress. However, our findings did contrast with Lin and Grisham's (2017) report of associations between personal distress and some spontaneous infant-oriented behaviours, including concerned expression, cognitive inquiry, and even approaching the infant. Contrary to Lin and Grisham's (2017) findings, emotion labelling, a more cognitive component of empathy, was unrelated to personal distress in our study. Possible explanations for these contrasting findings include between-study contrasts in: (i) sample age; (ii) study setting (the availability of a toddler's own comfort objects in their home allowing for self-distraction in the more naturalistic context); and (iii) parental involvement.

With regard to potential effects of gender on toddlers' reactions to the crying baby paradigm, our results indicate that similarities between boys and girls greatly outweighed contrasts. Specifically, while boys were less likely than girls to label the baby's emotion, there were no gender differences in the frequency of attentional, behavioural or empathic responses to the crying baby paradigm. This was unexpected given the previous findings that girls were more empathic (e.g., Spinrad & Stifter, 2006). In addition, the one gender difference that did emerge was most similar to previous studies' measures of cognitive empathy, which have been shown to be more similar across genders than other aspects of empathy (Volbrecht, Lemery-Chalfant, Aksan, Zahn-Waxler, & Goldsmith, 2007).

Importantly, there was a significant difference between the expressive language scores of those toddlers who did or did not complete the crying baby paradigm. Though expressive language was controlled for in the majority of the statistical analysis, this difference was marked and should be noted. This difference was likely due to different time constraints on the research visit as those children with less sophisticated language completed the visit more slowly and therefore were more likely to have tasks dropped. In

the future, care should be taken to ensure there is adequate time for the paradigm regardless of the toddler's communication abilities. Similarly, the toddlers who completed the paradigm had older mothers; to ensure generalizability, the paradigm should be completed with a more diverse age range.

2.14.2. Responses to the crying baby at 36-months. Our findings at 36-months expand the literature even further, showing that individual differences are seen even at an older age. Again, responses were clustered in an expected pattern, such that attending to the baby, labelling the baby's emotion, engaging in prosocial behaviour, and showing empathic concern were each significantly related to each of the other responses; this pattern illustrates a number of individual responses that may contribute to overall empathic responding. In addition, though there was a clear picture of empathic responding, individual differences were still present at 36-months, further extending Nichols, Svetlova, and Brownell's (2015) findings.

There were fewer responses to the baby when the children were 36-months old. This was surprising, considering the expected increase in empathy over time. However, it could be that the same empathy-eliciting events do not promote the same responses developmentally. Our results contrast from research that suggests there are increases in empathic responding over time (e.g., Zahn-Waxler, Radke-Yarrow, Wagner, & Chapman, 1992) and research that shows stability in mean responding across ages (e.g., Jambon, Madigan, Plamondon, Daniel, & Jenkins, 2018). These drops in responding may also be due to the settings of the visits; nurseries are often a place where babies are crying all the time and there are adults who are supposed to take care of the crying. Indeed, some children may not have taken care of the baby at home, either, as there were adults somewhere nearby, including the baby's "parent," a researcher who spent the time the baby was crying

doing other things. The lack of responding may also be due to some children's ability to tell that the baby was just a doll. Indeed, one child, after going over to the baby and saying he wanted to help it, put the doll on the ground and began searching for the speaker, which he produced in a flourish of "this is silly."

The one response that decreased in an expected manner was personal distress. Eisenberg, Fabes, and Murphy (1996) theorise that the inability to reduce one's own distress when empathically feeling the distress of another may be due to poor emotion regulation. The percentage of children who showed moderate or strong distress fell from 39% at 24-months to only 27% at 36-months. This drop may indicate age-related improvements in emotion regulation. Indeed, our findings were in line with Lin and Grisham's (2017) results of generally low levels of personal distress: the three-year-olds in their study spent, on average, 30.81 seconds of four minutes of a baby crying in distress.

Of note, empathic concern and personal distress were still unrelated at 36-months, further supporting the theoretical views of personal distress and empathic concern as distinct constructs (e.g., Cole, Michel, & Teti, 1994; Eisenberg, Fabes, Murphy, et al., 1996; Fink, Heathers, & De Rosnay, 2015). This finding, similar to that at 24-months, also contrasts with Lin and Grisham's (2017) report, outlined above, even when the children were the same age, as personal distress was also unrelated to emotion labelling. However, the relatively few occurrences of emotion labelling at 36-months made this association difficult to investigate. This may have been due to the contextual setting—there was not an obvious person to talk to about how the baby was feeling.

Children's responses to the crying baby did not vary much by gender at either time point. The overall lack of gender differences adds to a mixed literature, supporting Lin and Grisham (2017), who found no gender differences in empathic concern, but contrasting with

others (e.g., Blandon & Scrimgeour, 2015, Christov-Moore, Simpson, Coude, Grigaityte, Iacoboni, & Ferrari, 2014). Moreover, at 36-months, there were no gender differences in emotion labelling, a key difference from our 24-month findings, but a finding more in line with previous research on cognitive aspects of empathy, which have shown fewer gender differences than behavioural aspects of empathy (e.g., Volbrecht, Lemery-Chalfant, Aksan, Zahn-Waxler, & Goldsmith, 2007). Interestingly, Warrier et al. (2018) found that, though there were sex differences in empathy in adulthood such that women had higher empathy scores than men, there were no genetic differences in empathy. The fact that there were no detectable gender differences at both 24- and 36-months suggests the environmental mechanisms that contribute to gender differences may not have yet come into play at these early ages. Indeed, Hay's (1994) review of prosocial behaviour suggests that gender differences in prosocial behaviour emerge between ages two and six—when children are beginning to regulate their prosocial behaviour in line with social conventions, and when parents are under more pressure to socialise their children in gender-stereotyped ways. The findings in the current study suggest these gender differences in empathy emerge after age three.

2.15. Crying baby paradigm over time

Some longitudinal stability in children's responses to the crying baby paradigm were found. Specifically, empathic concern and prosocial behaviour were stable, especially when controlling for the location of the later time point. These asscociations were particularly striking, considering the differences in the paradigm at each time point and the overall decrease in responding. At the first visit, all children were seen in a familiar setting, with a parent present and involved. At the second visit, children were seen in different settings, often nursery settings where babies cry all the time, and, during the paradigm, had

no trusted adults present to encourage prosocial behaviour or reassure them that it was OK to try to help the baby. That said, the overall decrease in behaviour over time may be artefactual, in that the realism of the baby doll was likely to be more convincing at 24-months than at 36-months. This decline is, however, in line with previous works that suggests there might be a slight decline in prosocial behaviour from toddlerhood into preschool (for review, see Hay, 1994). Hay (1994) suggests that preschool children are more aware of what is socially appropriate for them to do—some prosocial actions are not always appropriate. It is possible that children knew that they should not touch a baby without an adult's help, and therefore they were not prosocial toward the baby. It could also be true that the nature of responding may change over time; this should be investigated with a more ecologically sound version of the crying baby paradigm or similar to use with older children—perhaps with a more realistic stimulus in a context where a child might be the distressed individual's only support.

The most striking associations were those that show a change in the nature of empathic concern and responding over time. Specifically, children who showed empathic concern at 24-months were more likely to engage in prosocial behaviour at 36-months, illustrating how empathy progresses over time into empathic responding. After first feeling with and for another person, one might show concern, and later engage in behaviours to alleviate another's distress (e.g., Hoffman, 2000). Our results suggest that, for some, this change might happen in the third year of life. In addition, individual differences in children's self-other differentiation, manifest through labelling of the baby's emotion, predicted later individual differences in empathic concern, as would be expected in a developmental trajectory (e.g., Kärtner, Keller, & Chaudhary, 2010). These findings expand the developmental scope of Nichols, Svetlova, and Brownell's (2015) report of marked

differences in responding from 18- and to 24-month old children, especially with regard to positive social expression and concern when the baby was crying.

In addition, attending to the baby at 24-months predicted attention, prosocial behaviour, and overall empathic concern at 36-months, suggesting that early attention to infant distress is key precursor to later empathic responding. Importantly, attention at 24-months was not related to personal distress at 36-months, indicating a specific association with positive responding. This association may be important to consider for clinicians who want to encourage early empathy, or to identify children who might be at risk for having lower empathy later in life.

Individual differences in personal distress did not show any stability over time. This further supports the idea that as children are able to regulate their emotions, they are able to overcome their own distress in the presence of a distressed other (e.g., Eisenberg, Fabes, & Murphy, 1996), and illustrates a progression of responding rather than a stable individual difference in responding. However, the absence of a trusted adult during the paradigm may have incentivised children to show less distress at 36-months than they did in the presence of their parents at 24-months; children may have been more likely to outwardly show emotion if there were someone to help them regulate sadness or worry.

Repeated measures ANCOVAs, covarying for location of the second visit, revealed two interesting longitudinal patterns. The first was a gender contrast in the stability of empathic concern, which was carried by boys, though not significantly, suggesting that girls' empathic concern was more variable. This is in line with research that suggests gender differences emerge from environmental influences such as socialisation (e.g., Warrier, et al., 2018), and that, when gender differences do emerge, more empathy was seen in girls, (e.g., Christov-Moore, et al., 2014; Catherine & Schonert-Reichl, 2011), who may be more

influenced by gendered socialisation of empathy. Second, there was an interaction of time and gender on emotion labelling. This is likely captured by the gender difference seen at 24-months and the similarity across genders at 36-months, indicating some catch-up by boys in both language and emotion-language usage. An additional contributor was likely the near-floor levels of emotion labelling at 36-months, perhaps due to context or that children have simply gotten used to babies crying by the time they are 36-months old.

2.16. Sticker sharing paradigm

Overall, 36-month-old children did engage in sharing behaviour. On average, 36-month old children shared nearly half of their stickers with an anonymous partner, with 70% of children sharing at least one sticker. These were markedly higher sharing results than in previous studies (e.g., Fehr, Bernhard & Rockenbach, 2008; Benenson, Pascoe, & Radmore, 2007). Our results were more in line with the children in Ulber, Hamann, and Tomasello's (2015) study, though sharing stickers with an unknown peer is markedly different from sharing rewards with someone you either work with or beside. Therefore, the current study's high occurrence of sharing should be considered above average. This high sharing is puzzling, especially considering the anonymity of the sticker recipient. Hay (1994) argues that sharing, by age two, becomes culturally regulated; the 36-month old children in the current study may have learned that they should share their possessions. Notably, 30% of children did not share any stickers at all, which suggests that, though our means were higher, children in our study were generally in line with developmental trends.

Unexpectedly, boys shared significantly more stickers than girls, though the mean differences deviated by a single sticker. This was surprising, as previous research has overwhelmingly found few gender effects (e.g., Brownell, Iesue, Nichols, & Svetlova, 2013; Newton, Thompson, & Goodman, 2016; Pettygrove, Hammond, Karahuta, Waugh, &

Brownell, 2013; Gross, Drummond, Satlof-Bedrick, Waugh, Svetlova, & Brownell, 2015; Smith, Blake, & Harris, 2013). However, where gender differences have been found, boys have given differently because of situational factors (e.g., Fehr, Bernhard, & Rockenbach, 2008; Guo, He, & Wu, 2019). Though our paradigm was very simple, there may have been factors about the situation that led boys to share more than they may have otherwise, since boys may be more sensitive to situation. For example, it might have been that knowing the recipient of the stickers was not going to play the games with the experimenter might have induced a desire to share more. This would reflect the increased sharing with out-groups that Fehr, Bernhard, and Rockenbach (2008) found. In addition, stickers were shared at the end of the visit, during which children received a lot of praise for doing a number of tasks. This might have improved their overall emotional state and encouraged more sharing, an inverse to the lower sharing by children who had been shown a sad video clip seen in the Guo, He, and Wu (2019) study. In both of these studies, girls shared equally well between conditions, suggesting less of an effect of situation on girls, perhaps rather than simply less sharing behaviour. Importantly, in a regression with responses to the crying baby paradigm considered, gender differences were no longer predictive of sharing, further suggesting situational nuances that resulted in a slight gender difference in sharing behaviour. Importantly, boys and girls seemed to enjoy the stickers the same amount, and care was taken to choose stickers that did not contained gendered toys or images, suggesting this gender difference was due to sharing rather than girls simply liking the stickers more.

2.17. Sharing and empathic responding

For the most part, sticker sharing and empathic responding were unrelated; and, when the behaviours were related, they were inversely so. Children who labelled the crying baby's emotions at 24-months shared fewer stickers at 36-months, but this could be due to

the fact that both groups were dominated by girls. Children with lower empathic concern at 24-months shared more stickers at 36-months. In fact, when controlling for the location of the second visit, prosocial behaviour at 24-months predicted less sharing at 36-months. It is important to recognise, however, that these associations were weak at best, and were not significant when included in a regression. This pattern suggests that, overall, empathic responding and sharing are unique constructs, and should be considered separately. Taking them as separate constructs is in line with the theoretical understanding that sharing and empathy emerge and are fostered via different pathways of development and socialisation (Dunfield, 2014; Paulus, 2014).

Conclusions

For the most part, toddlers were able to respond empathically, and there were individual differences in responding. Importantly, personal distress and empathic concern were not mutually exclusive or inversely related, suggesting that some children may be too distressed to cope whilst others may be catalysed by their distress to the situation. There were very few gender differences at 24-months, suggesting that boys and girls are capable of empathy in equal measure, and that any gender differences that may be evident later in life have not come online at age two. At age 36-months, children still responded to the crying baby, but with slightly less vigour. This may be due to the methodology used and the location of the visit. There were very few gender differences in empathy at either time-point, suggesting that gender differences seen in older children and adults are seen later in life than toddlerhood. Promisingly, individual differences in empathic concern were relatively stable, and behaviour toward the distressed baby at 24-months was related to empathic concern at 36-months in interesting and developmentally appropriate ways, with some aspects of responding, such as overall concern, being consistent, and some, such as

attention, predicting later empathy. 36-month old children shared at a relatively high rate, and boys shared more than girls. Sharing and empathic concern were unrelated, highlighting that sharing and empathy are distinct constructs. Therefore, empathy and sharing have been considered separately in future chapters. Influences on individual differences in empathy and sharing are discussed in future chapters.

Chapter 3. Toddlers' Television Content: What Are Toddlers Watching and How Prosocial Is It

Walking through a park on a sunny day, one might hear children playing all sorts of games: Hide and Seek, Freeze Tag, and King and Queen are as popular as ever, but so are games such as "Elsa and Anna" or "Lightning McQueen." Likewise, nursery classrooms are full of children wearing t-shirts and Wellington boots emblazoned with *Peppa Pig*, the *Paw Patrol* pups or other cartoon characters. The fact that television and film-watching[2] are ubiquitous not only in downtime but also in the screen-free world makes it vital to understand how its imitable content might affect children's development. Achieving this goal requires a full understanding of the range of children's television content. This chapter will focus on three main ideas: 1. what programmes 24-month-old children in the current study were watching; in particular, prosocial content in television, as well as format features of programmes that may influence transmission of prosocial content will be examined. Antisocial television content will also be discussed, as it may relate to prosocial content, since prosocial behaviour often follows antisocial behaviour (e.g., Mares & Woodard, 2005), and is an important consideration for understanding the context and transmission of prosocial behaviour. 2. Beyond understanding what prosocial content is available, children's television diets will be investigated. Television diets are conceptualised as what children's unique collection of watched programmes contains, on average. The variance in prosocial content, antisocial content, and format features across different programmes/films will be discussed. In addition, differences in children's television diets as a function of gender will be investigated. 3. Finally, how well parents identify the variance in children's television content will be explored. Specifically, whether parents are better at identifying prosocial

[2]Please note, television will be used to refer to episodic television programmes and films, unless otherwise noted. Programme/programmes will also be used interchangeably for episodic programmes and films.

than antisocial content or vice versa will be addressed. In addition, whether there are differences in identifying prosocial and antisocial content between parents who watch programmes with their children and those who do not will be explored. The literature underpinning each of these research questions will be discussed first.

3.1. Children's television content

3.1.1. Available content. For decades, parents have relied on public broadcasting for consistently appropriate content for their children. Indeed, although content from around the world is available to children through the internet, local content remains popular. On average, 82.5% of children within the UK aged 4-15 watched broadcast television each week in 2017, which includes 5,535 hours of CBeebies, an outlet of the British Broadcasting Corporation, that is aimed at children aged 0-6 (Ofcom, 2018b). CBeebies "aspire[s] to demonstrate positive behaviours for [their] audience, encouraging resilience, respect and a sense of accountability for the preservation of the world around them. [They] want to underline the importance of empathy and tolerance for one another in as many new and existing brands as possible" (Taylor, 2019). These goals are developmentally appropriate and, if followed, should result in age-appropriate content that models prosocial behaviour. The current study aims to address whether the content children are watching at 24-months achieves this goal.

In addition to CBeebies content, children are exposed to non-local content via platforms such as Amazon and Netflix. In contrast with trusted local network programming, new global content does not necessarily have the same ideological positioning as Cbeebies. To help parents make informed decisions about what they show their children, Common Sense Media (CSM) in the United States reviews children's films and television programmes to create a guide for parents and teachers. For example, for *Dora the Explorer*, CSM

(Herman, 2019) gives 4/5 stars and says the programme is appropriate for children aged 3 and older. The programme gets 3/5 stars for educational value, 4/5 for positive messages, and 3/5 for positive role models. CSM notes that there is no violence or scariness, no "sexy stuff," no foul language, and no drinking, drugs, or smoking. Following these ratings, parents can leave comments about their experiences with the programme. This sort of review is present for many programmes in the both the United States and global markets, and seems to be comprehensive. The current study aims to elaborate on this work by looking specifically at the prevalence of prosocial and antisocial behaviour in the programmes that are popular for the study sample. The objective coding employed in the current study will address gaps in CSM coding. Specifically, CSM does not include ratings of specific behaviours, and thus may be less useful to parents and researchers than quantifiable content coding. In addition, CSM is not clear about who is rating programmes, and therefore lacks transparency. The current study reports detailed content coding to be used for quantitative analysis and to aid in understanding of the variance in specific behaviours, and provides clear and transparent methodology.

3.1.2. Prosocial screen content. Television is limited in its ability to reach all children in similar ways (Wilson, 2008). In addition, it is simpler for television programmes to show helping behaviour than social acceptance (Wilson, 2008), so how well television may transmit prosocial behaviour may be constrained by these features. Promisingly, because children are able to form attachment-like relationships toward media characters (Wilson, 2008), they may experience shared emotion with characters and therefore practice empathy. Indeed, in content-analysis of preschool programming, Linebarger, Brey, Fenstermacher, and Barr (2017) found that peer modelling of positive behaviour was 2 times higher in general learning programmes (programmes that focused on numbers,

colours, etc.) than in prosocial programs. This difference may be due to the difficulty of modelling certain prosocial skills such as showing acceptance and empathic responding, whereas a peer modelling how to build a tower with blocks is simpler to portray.

In addition, prosocial content in television is discussed less often than antisocial content. Interestingly, Mares and Woodard (2005) found that television programmes for children frequently included aggressive and antisocial content, even if there was prosocial content – either of these behaviours may be perceived and replicated by children (e.g., Mares & Woodard, 2005). Similarly, Linebarger, Brey, Fenstermacher, and Barr (2017) found that prosocial content was generally low in a survey of educational programmes, and when it did exist, it was present most often in peer interactions that included both antisocial and prosocial actions. This is concerning; if television is able to socialise behaviour, showing both antisocial and prosocial behaviour could be detrimental to children's behaviour as children may imitate antisocial behaviour. Indeed, between the ages of three- and four-and-a-half-years, most children (74%) are decreasing their aggression whilst increasing their prosocial behaviour (Jambon, Madigan, Plamondon, & Jenkins, 2019). This suggests that early childhood is a key time for good prosocial socialisation to aid this process.

There may be positive effects, however, in including both prosocial behaviour and antisocial conflict. Jambon et al.'s (2019) finding highlights that both behaviours are common and that there is a typical developmental trajectory of children's behaviour that usually results in more prosocial behaviour than antisocial behaviour as children get older. In addition, Linebarger et al. (2017) note that showing antisocial behaviours not only illustrates that antisocial behaviour is part of life, but importantly creates a context in which to model how to respond appropriately. Therefore, showing antisocial behaviour might be

necessary for the socialisation of prosocial behaviour and may help in teaching emotion regulation and prosocial responsiveness.

Programmes should be mindful, however, to depict resolutions to antisocial behaviour in ways that are easily understood and within a window that children will be able to attend to the full narrative. Some antisocial content is also extremely aggressive, and may not be in the realm of real-life possibilities (for example, winning a sword fight and killing your dragon opponent). Therefore, a distinction must be made between content that creates a platform for appropriate prosocial responses and content that is highly aggressive that may promote aggressive imaginative play with each other. The current study aims to identify whether children watch similar amounts of prosocial and antisocial content, both in the overall corpus of programming watched and in individuals' television diets in order to better understand what behaviours children see and may imitate.

In all, children have a variety of programmes available to them and these programs likely vary in several dimensions, including animation, pacing, conversational strategies, and content, specifically depictions of prosocial, and antisocial behaviour. Beyond specific programme differences, children's own individual television experiences likely differ. However, though the literature points to a large amount of possible programming and the likelihood of variance in form and content, researchers have not kept up with which programmes children are actually, both in the overall corpus of what programmes children watch and in children's individual television diets.

3.1.3. Transfer of television content. Children are able to understand and imitate actions from television by the time they are 24-months old (e.g., Anderson & Hanson, 2010). However, often children struggle to do what they saw a person on screen do when faced with the same task, that is, they are unable to imitate or use information viewed on the

screen in real life – this is the so called 'transfer deficit' (Barr, 2013; Zimmermann et al., 2015). This deficit is influenced by children's memory and cognitive abilitieis (Barr, 2013). This phenomenon has most typically been studied with respect to learning academic and specific skills, such as building a puzzle (Barr, 2013; Hipp et al., 2017; Zimmermann et al., 2015), but may occur in transferring prosocial content, as well as more academic content. Chapter 5 will explore in detail whether this transfer deficit occurs for prosocial behaviour in toddlerhood, as well as what might moderate the associations between screen time and prosocial outcomes. The current chapter serves to understand what content needs to be explored to investigate these associations, and why.

The transfer deficit increases as the transfer distance increases, defined along content and context dimensions (Hipp et al., 2017); that is, it is more difficult to learn with a larger difference between what is seen on screen and real-life tasks. Hipp et al. (2017) determined, after reviewing extant research on the transfer deficit that there are ways to decrease this deficit, such as increasing the number of times the behaviours or actions that children are expected to imitate are shown on screen. In addition, adding social engagement and contingency clues (described here as eye contact, body movements, vocal changes, and shared context) may help to decrease the deficit (Hipp et al., 2017). Social engagement could be established via engagement from on-screen characters or narrators or through co-viewing with parents. Therefore, when assessing how much a child may imitate from screen time, it is vital to consider the screen content and the context of viewing.

Most research that investigates the transfer deficit involves showing children a specific skill on screen and then asking them to repeat it in real-life (e.g., Lauricella, Barr, & Calvert, 2016; Zimmermann et al., 2015; Zimmermann, Moser, Lee, Gerhardstein, &Barr, 2017). For example, Zimmermann et al. (2015) showed children how to put together a

three-piece puzzle via a video or live demonstration. The standard transfer deficit was seen here, such that children who saw the demonstration live performed significantly better than children who saw the demonstration on screens and performed better than at baseline.

If there is a deficit when children are shown specific tasks without any other behaviours being shown on screen at the same time, there may be even more of a deficit when there is more screen content to take in (e.g., a scene where multiple things are happening and/or a scene where the setting is interesting or eye-catching) or a longer narrative to distract the child from the desired transferrable behaviour. Watching typical television programmes may also increase the transfer deficit when a real-life situation is not exactly the same as the screened situation, as transfer then requires more attention to specific behaviour and more cognitive work to attend to and retain the desired imitable behaviours. Equally, however, relatable content such as how to act prosocially in a situation a child has found him/herself in before may be better retained than task-driven content (Hipp et al., 2017). More research is needed to investigate if there is in fact a deficit in translating content from children's real-life viewing into everyday life. It could be that television is more powerful for teaching social skills than cognitive skills, especially at age two-years, due to the subtle and consistent inclusion of social behaviour and the critical developmental period for prosocial development. This idea will be explored in detail with analysis in chapter 5.

In addition to being applicable to everyday life, content must be developmentally appropriate and easily comprehendible for young children. Indeed, the cognitive skills needed to most effectively transfer social content from screen to behaviour may not be available to very young children; evidence from a meta-analysis of 108 effect sizes from 34 studies shows an increase (Z_{Fisher} = .27) in the positive effect of prosocial content on

prosocial behaviour between ages three and seven (Mares & Woodard, 2005). In contrast, Kirkorian, Pempek and Choi argue the transfer deficit likely declines by age three (2017). Perhaps what children take away from screens depends heavily on the difficulty of the learning task and the relevance of the memory of screen content to the real life academic or social situation (Kirkorian et al., 2017). For example, Rasmussen et al. (2018) found that three- to four-year-old children used emotion regulation strategies they were shown in *Daniel Tiger's Neighborhood* (a television show aimed explicitly to encourage emotion regulation strategies) more often than peers who did not watch the show. This contrast was not true for five- to six-year old children, and, importantly, this was not due to ceiling effects on outcome measures, highlighting that toddlerhood may be a crucial time for social learning from screens. Thus, researchers, parents and teachers must consider the type of prosocial content and how well it matches current learning goals, which are likely to include prosocial behaviour.

3.2. Television content analysis

3.2.1. Gaps in content analysis. Most research on prosocial content in children's television has utilised specific, researcher-chosen, prosocial programmes viewed by children in an experimental setting (e.g., Silverman & Sprafkin, 1980; Sprafkin, Liebert, & Poulos, 1975; Coates, Pusser, & Goodman, 1976). Although this research is important for the conceptual understanding of how prosocial content might be effective for prosocial behaviour learning, in a world where children are exposed to media content for several hours a day, there may be too much input for these highly prosocial programmes viewed in the lab to have any effect on real life. Therefore, it is necessary to investigate the content children are watching in their everyday lives. Furthermore, little new research published in the past three decades has been conducted on the effects of prosocial media. For example,

in a 2005 meta-analysis exploring the effects of prosocial content, Mares and Woodard included 1989 as the latest date of publication, despite broad inclusion criteria. With regard to toddlerhood, this meta-analysis included only one study of 36-month old children, and none with younger children, despite no minimum age for article selection. More recent research has followed a pattern of studying older children, or has focused on educational content such as mathematics or word-learning (e.g., Linebarger, Brey, Fenstermacher, & Barr, 2017; Lillard, Drell, Richey, Boguszewski & Smith, 2015). It is imperative to understand how children under three are experiencing television, especially prosocial television, as researchers' and national organisations' reports point to an ever-increasing prevalence of media in toddlers' lives; this increase is happening at a time when prosocial development is critical.

3.2.2. Lessons from educational television research. The research being conducted on educational television, which includes television that focuses on learning goals such as letters, numbers, and colours, is important and should be considered to understand why research on prosocial content is both needed to better understand development and to help parents accomplish their goals for children's television time. The shift in focus to educational television may follow a trend in focusing on children's education from early years. For example, *Baby Einstein*, a company that created videos for young children sold as educational was reportedly so successful that 1/3 of homes with children between six-months- and two-years-old had at least one *Baby Einstein* video in 2002 (Graham, 2017). Educational toys are also popular; Business Insider (Kamenec, 2018) stated, "during your child's growing years, it is important to provide them with educational toys that allow them to grow while they play," and "the beauty of educational toys is double fold, as they appeal to both children and parents." These sweeping statements suggest that there is a societal

focus on educating children in school-like ways from a young age. However, playful social interaction is important for social development of children (Ginsburg, 2007), and learning social skills is an important goal of toddlerhood. The overarching goal of this dissertation is to address the gaps in the literature about what younger children learn from screens and prosocial television. The current chapter aids this goal by using a rigorous and detailed coding scheme to investigate all of the programmes children are watching at home and updating the literature to include information about prosocial television as screens are becoming even more prevalent in children's lives.

Research on educational television is important for understanding how screen time may influence children's development, and has provided helpful frameworks for measuring content. Though the majority of screen time research is still largely experimental and relies on showing children specific programmes and examining subsequent behaviour, there has been some content analysis of television aimed at children. Linebarger et al. (2017) conducted a comprehensive analysis of programmes considered educational for preschool children. Though the focus of Linebarger et al.'s (2017) was neither prosocial content nor how prosocial content related to prosocial behaviour, this study formed the basis of the coding scheme used in the current study, since it addressed many similar format and content questions, though the focus here was on educational content. Linebarger et al (2017) examined the structural and content features of 15 television programmes, specifically; formal features (e.g., cut rates and scene changes), interaction types (e.g., child with adult or child with child), repetition (e.g., how often concepts were repeated), setting, narrative type (e.g,. traditional or conversational, whereby a character or narrator talks directly to the audience, usually with questions), and educational content. The current study builds on this work by adapting several elements of the content coding (namely format

features, setting, and narrative type) and includes additional frequency-based content coding of prosocial and antisocial. Furthermore, the current study extends the work of Linebarger et al. (2017) by investigating six times as many programmes and potential associations between television content and children's behaviour (see Chapter 5).

3.3. Programme type and format features

3.3.1. Interactivity. When examining the effectiveness of content, several features of programmes beyond narrative content must be taken into consideration. Some features of screen content and context make the experience more interactive, which may help children better retain and utilise what they are experiencing on screen (Hipp et al., 2017). Touch screens have been able to decrease the transfer deficit of semantic information, though the information is still "perceptually impoverished… relative to real world experiences" (Hipp et al., 2017, p. 37). It is likely that interactive screen usage, even if on a passive screen (e.g., engaging children by asking questions rather than asking them to physically move objects on a touch screen), will have a smaller transfer deficit of prosocial content than passive screen time. For example, Zimmermann et al. (2015) found that when children generated a label for the puzzle they saw on screen, therefore making the experience interactive, they were better able to transfer knowledge. In addition, Linebarger and Walker (2005) found that children learned better from programmes with interactive narratives (i.e., characters addressing the child viewer directly, so-called 'breaking the fourth wall') than non-interactive narratives; children who watched interactional programmes were assess as having 13 more vocabulary words on average at 30-months than non-viewers of television, whereas children who watched non-interactive programmes had 10 fewer vocabulary words on average at 30-months than non-viewers. A similar effect

might be true for conversational television, which is interactive in a different way, and the transfer of prosocial skills

3.3.2. Pacing. Pace, or the speed at which programmes progress has most commonly been conceptualised as scene changes per minute (Goodrich, Pempek, & Calvert, 2009) and might also contribute to how well young children comprehend content. However, little work has been done to confirm this in very young children. For 160 kindergarten through fourth grade students[3], Wright et al. (1984) found that slow-paced programmes (programmes with longer scene lengths) were recalled better than fast-paced (programmes with shorter scene lengths) programmes, and this might also be true for toddlers due to longer scenes allowing for processing time. However, It is also true that children must be paying attention to screen content to learn anything from it (Anderson, Lorch, Field, & Sanders, 1981; Anderson & Pempek, 2005; Barr, 2013; Kirkorian et al., 2017), and rapid visual and auditory changes may elicit orienting responses, which may increase attention (Anderson & Pempek, 2005). Indeed, there is a change in television viewing around 30-months of age that shows an increase of attention, perhaps due not only to an ability to comprehend more programmes, but also to children becoming cognitively active in television viewing, rather than simply watching lights moving on screen (Anderson & Pempek, 2005). At 24-months of age, it may still be necessary to include rapid changes to sustain attention—it is important to find a balance of interesting, comprehensible content that is paced appropriately for attention and comprehension in order to understand (and in turn) foster prosocial development.

3.3.3. Animation. Whether or not any or all of a programme's characters are animated may make a difference to how content is understood and replicated. Schmitt,

[3] Ages were not given for participants, but kindergarten through fourth grade students would typically be between four- and ten-years-old

Anderson, and Collins (1999) found that children looked more at animated characters than live-action characters, and as children got older, they increasingly preferred animated to live-action content (the difference score in preference between animated and live-action content at age 2 was 1.2 points; by age 12, it was 27.5 points). However, data were collected in 1980 and 1981, and most animated content was targeted at slightly older children (Schmitt, Anderson, & Collins, 1999), so this attention effect may not be seen with the variety of programming viewed by the current sample. Though there is little research on the topic, it may be true that children are more likely to replicate behaviours of live characters than cartoons, perhaps due to the perceptual salience of real-life, fully-human characters. It is unclear whether children will learn social skills better from animated or live action characters. The current study aims to address this question.

Importantly, all of these features of television content have been studied independently and by utilising a small number of specific programmes chosen by researchers. However, it is clear that television content varies widely, and may include many varied combinations of structural and content features that could influence the transfer deficit. For example, a programme may be animated and have long scenes but utilise conversational techniques and have highly relatable characters. Therefore, work is needed to identify what range of content is available to children and to understand the individual variation in television diets – features of individuals' specific range of viewed programming (e.g., the variation in how prosocial children's typically viewed programming is). The current study utilises detailed coding of children's programming to investigate this range of content. Once this is understood, researchers can begin to establish what features of programming are most helpful for specific learning goals and behaviour.

3.4. Child gender

As highlighted in the introductory chapter, boys and girls may be watching different things on screen. Indeed, Cherney and London (2006) found that, in a sample of 120 five- to 13-year-old children, girls watched programmes that were rated to be more feminine and boys watched programmes deemed more masculine. Importantly, however, there was an interaction between gendered qualities and age ($\eta^2 = .07$) – as children get older, their programming also become more gendered. Relatedly, adolescent boys and girls spend their screen time very differently.

Indeed, many television programmes and films appear to be targeted at one gender or another – *Thomas and Friends* is full of mostly male vehicles and is action-packed, compared to *Cinderella*, a film about a princess who wants to dress up and go to a ball. These gendered messages might indirectly guide boys and girls to watch different content even in toddlerhood. This sort of gendered viewing would be in line with gendered toy preferences, which have been seen as young as three-months old (Alexander, Wilcox, & Woods, 2009); girls preferred to look at a doll ($d > 1.0$) and boys preferred to look at a truck ($d = .78$).

Further, Mesman and Groeneveld (2017) argue that gendered parenting is often subtle, and can include leading children to gendered products. Leading children to more gendered content may be one way parents gently shape toddlers' gendered preferences; this may be reflected in gender differences in screen diets. Therefore, gender differences may be seen in screen content, both content features such as prosociality and aggression, as well as programme choices, such as boys watching more vehicle and action-based programmes and girls watching more programmes with female protagonists and more stereotypically feminine storylines such as going to a ball. The current study will investigate

whether there are gender differences in the number of children who watch popular programmes and whether boys and girls watch different amounts of prosocial and antisocial content. In particular, it is expected that boys will watch more antisocial programming, and girls will watch more prosocial programming.

3.5. Parents' ratings

It is important to identify what parents think of this content since parents are the ones who police what content children see. Therefore, understanding parents' perceptions of content and how they relate to objective ratings of programming will help identify ways to ensure that the content that is best for children is easily identifiable. Knowing what features parents are able to recognise about programmes and what aspects of content they are less good at distinguishing will point to ways content creators should be clearer in illustrating behaviours on screen and may help suggest whether networks should share rating information with parents and caregivers.

In addition, it is important to know what parents are seeing when they engage with children's programming, either directly or peripherally, so that external raters can establish how much information parents need. This is particularly important to help parents accomplish their goals for their children's television time, which will be discussed in Chapter 4. *Common Sense Media* has provision for parents to rate and comment on the programmes it reviews. This service is helpful to parents deciding whether or not to allow their children to watch certain programmes, but it does not consider how carefully parents are watching these programmes.

The current project aims to establish how reliable parents are as raters of their own child's television content (e.g., identifying how prosocial or antisocial their children's favourite programmes are) to identify gaps in parent understanding. This understanding will

aid parents, content-creators, and policy-makers to ensure that children's screen time helps parent accomplish goals of delivering safe, generally positive, and age-appropriate content to their children. In addition, understanding what parents are seeing will help researchers and policy makers give parents the tools necessary to establish which programmes are useful for addressing developmental goals such as prosocial behaviour. Specifically, the current study will establish whether parents are just as good at identifying prosocial content as they are antisocial content. Cheng et al. (2017) found that parent and teachers agreed more when rating children's antisocial behaviour than prosocial behaviour, suggesting that antisocial behaviours are easier to identify. Indeed, antisocial behaviour often requires action or comment, and parents may be trying to actively avoid allowing their children to view it, whereas prosocial behaviour may seem like an added benefit and not be parents' focus when deciding whether or not a programme is appropriate. In the same way, parents may see antisocial behaviour on screen and take note of the abnormal aggression or otherwise harmful behaviour, whereas prosocial behaviour may go unnoticed and the variation in prosocial behaviour between programmes may be discreet. In addition, the current study will investigate whether parents who watch programmes with their children are better at rating programmes' prosocial and antisocial content than parents who do not watch with their children, and so may have decided whether programming was appropriate due to reviews, other parents, or after seeing some of the programme and deciding it was acceptable. It is expected that parents who watch programmes with their children are better at identifying what variety of content programmes include than parents who do not watch with their children. However, since parents choose what programmes children watch, this difference is not expected to be vast, as even parents who do not habitually watch programmes with their children are still likely to have strong feelings about opinions about

how prosocial and antisocial programmes tend to be. Indeed, if parents limit screen content to Cbeebies programming, they may assume the prosociality and general appropriateness of programmes.

3.6. Current study

The broad aim of the current chapter is to utilise detailed content coding of programmes children in the study watched regularly to identify key trends. Four research questions were addressed:

1. What programmes are children watching; do programme choices vary by child gender, and are children watching programmes that Common Sense Media deems age-appropriate?

2. What are the overarching trends in prosocial and antisocial content in children's programmes, and does content vary by format features (e.g., conversational techniques, scene length, and/or animation), or by *Common Sense Media* minimum age suggestions?

3. How variable are individual children's television diets and do these television diets vary systematically as a function of child gender?

4. How congruent are parents' identification of prosocial and antisocial content in their children's programming compared to experimenter ratings and expert (CSM) ratings, and does that ability vary as a function of (i) type of content (e.g., prosocial vs antisocial); (ii) if parents watch with their children; and/or (iii) child gender?

Method

3.7. Measures

3.7.1. Technology interview. When children were 24-months old, parents (180 mothers and 179 fathers) completed a comprehensive interview about their children's

screen time (see Appendix B for interview questions). As part of this interview, parents reported up to five television programmes or films their children frequently watched and enjoyed, and indicated which of these five was their child's favourite. Partners were often rating different programmes; therefore, all responses were considered as independent parent raters, not tied to their children's or partner's data, which also maximised the number of independent parent raters per programme. At the end of the interview, parents rated their child's favourite television programme on a number of characteristics from 0 (not at all true) to 3 (definitely true). Parents rated the following characteristics:

- helps their child learn new words,
- makes their child laugh,
- can be a bit scary,
- teaches their child about letters and numbers,
- encourages their child to try new activities,
- shows children/characters being kind,
- shows children/characters being adventurous,
- shows children/characters being helpful,
- shows children/characters being mischievous,
- and shows children/characters being good friends.

169 mothers and 167 fathers answered these questions, of whom 12 mothers and 13 fathers reported either no favourite programme or that their children did not watch television. A total of 311 responses was therefore considered. There were no mean differences in mothers' and fathers' ratings of the favourite television programmes (collapsed across all television programmes), ts ≤ 1.15, ps $\geq .249$. These ratings were

averaged across all raters for each programme to be investigated alongside researchers' coding.

3.7.2. Television content. Overall, parents identified 107 programmes viewed by the children in the sample (see Appendix C). Of these, 10 were not available to watch at the time of coding, 1 was not in English, and 6 were named too vaguely by parents to identify. The remaining 90 programmes were selected to be coded. After piloting a coding scheme, it was evident that television programmes are largely formulaic and coding all available episodes was not feasible. Therefore, one hour (± 10 minutes to include only full episodes) of television content was coded for each programme, and entire films were coded, regardless of length. A random number generator was used to choose episodes of programmes. Episodes were chosen from those available on Netflix, BBC iPlayer, Amazon Prime, YouTube or on DVD. Enough episodes to make up an hour were coded. Codes based on Lienbarger, Brey, Fenstermacher, & Barr (2017) included:

- Average length of scenes (each scene was defined by a change in physical location, as in Linebarger, Brey, Fenstermacher, & Barr, 2017), and average length of scene was used as the unit to conceptualise pacing of programmes,
- Whether the scene was traditional (narrative) or conversational (inviting the audience to answer questions/participate, such as asking "which path is the red path?").

The frequency of prosocial behaviours included in the narrative were also coded, including helping with a goal, helping someone who has fallen or dropped something, sharing, cooperation, empathy/comforting someone in distress, empathy for positive emotions (such as being happy for someone for whom something good has happened), and

including someone. The frequency of antisocial behaviours was also recorded; behaviours included physical aggression, verbal aggression, taking things, and excluding a character. Ten percent of the original 107 (11 programmes) were coded by three coders to establish reliability, and ICCs were good, ranging from .773 to .999. This coding was particularly novel and categories of prosocial and antisocial behaviour were created through a process of trial and error whilst watching an animated episodic programme, a live-action episodic programme and a film.

Whether the programme was animated, live-action, or both, and whether it was a film (feature-length or short) or an episodic programme was recorded. Due to the ensemble nature of many casts of characters, and some gender and age ambiguity in programmes revolving around animals and anthropomorphised objects, main character gender and age were not identified.

Common Sense Media's recommended minimum recommended age for viewing each programme was recorded (found on CommonSenseMedia.com).

The location(s) of the programme was/were also recorded and placed into one of 7 categories (based on Linebarger, Brey, Fenstermacher, & Barr, 2017): (1) places a child would typically be (i.e., town, home, or school); (2) a fantasy land; (3) places a child would typically be and an abnormal setting (such as in Paw Patrol where characters go to a science-fiction like headquarters); (4) places a child would typically be and a fantasy land; (5) a stage setting (such as in *Swashbuckle*); (6) a stage setting and places a child would typically be (such as in *Mr. Tumble*); and (7) a fantasy land and a stage setting.

3.7.3. Television diets. The content coding was applied to up to nine programmes or films (hereafter referred to as programmes) each child watched (each unique programme reported by mothers and fathers) to create several content variables unique to each child.

By calculating the mean score across the set of individual programmes a child watched, the following child-specific markers of screen content were derived:

- The grand mean of the number of antisocial / prosocial behaviours per minute,
- The grand mean for pace (the overall mean scene lengths for each programme a child watched),
- The mean proportion of scenes that were conversational across children's programmes,
- The proportion of programmes that had any animation.

The structure of the parental interview did not lend itself to determining how much of each programme in children's diets they watch. Therefore, whether it would be better to analyse children's favourite programmes instead of their full television diets was investigated. Prosocial behaviours per minute and antisocial per minute of children's favourite programmes were also calculated and correlated with the overall television diet means of prosocial and antisocial content, in order to establish whether utilising the full range of programmes children watched (e.g., their full reported television diets) rather than or just their favourite programmes was preferable. Average scores across all programmes were highly correlated with scores for mother- and father-reported favourite programmes favourite programmes ($rs \geq .533$, $ps \leq .001$). Therefore, a more comprehensive approach was used and the overall scores created as averages of scores of programmes either parent mentioned – children's full television diets – were included in analyses.

3.8. Analysis plan

First, descriptive statistics were reported for what programmes children are watching and chi squared tests investigated whether the frequency of children who watch the most popular programmes varied by child gender. Whether children were watching

programmes that *Common Sense Media* deemed age appropriate will be examined by looking at descriptive statistics.

Next, the overarching trends in content and format features in children's television content were investigated. Descriptive statistics for all television programme variables for programmes themselves (referred to as analyses on the full corpus of programmes, which contrasts with programmes combined into individuals' television diets). How features of programmes related to each other were investigated using correlations. Exploratory analyses were run to establish whether programmes with different format features (specifically scene length, usage of conversational scenes, and animation) differed in prosocial and antisocial content using ANOVAs and independent-samples *t*-tests. Finally, whether programmes differed in prosocial and antisocial content based on CSM's recommended minimum age was investigated using independent samples *t*-tests.

Following this, the variation in children's television diets was investigated. Descriptive statistics were reported about the range of prosocial and antisocial content and format features of programmes across children's television diets. Correlations were run to investigate how content and format features were related. *t*-tests were run to establish whether children of different genders experienced different amounts of prosocial and antisocial behaviours on screen.

Finally, to investigate how parents rate programmes, descriptive statistics for parents' ratings were also reported. Correlations between parents' codes and researchers' codes were run to establish how accurate parents were at identifying how prosocial and antisocial children's content was. These correlations also helped identify whether parents were equally good at identifying prosocial or antisocial content. Next, correlations were run to investigate whether parents who watch programmes with their children scored

programmes more similarly to objective coders than parents who never watched television with their children. Independent *t*-tests were run to investigate effects of child gender, on parents' ratings and objective ratings of overall prosocial and antisocial content. Finally, whether any parent or objective ratings differed by *Common Sense Media's* recommended minimum age of viewing was investigated using independent t-tests and correlations.

Results

3.9. What programmes are children watching

Children watched a large variety of programmes, which varied in popularity (see Appendix C). The most popular programme was *Peppa Pig*, which 81 children (44%) watched according to one or both of their parents, followed by *In the Night Garden* (N = 67, 36%), *Thomas and Friends* (N = 55, 30%), *Mr. Tumble* (N = 44, 24%), and *Hey Duggee* (N = 36, 19%). 35 programmes were only watched by one child. Appendix C lists how many parents answered questions about each programme, having identified it as their child's favourite; mothers and fathers were included as separate reporters. 61 programmes were identified as favourites; 69.4% of parents reported the same show as their partner as their child's favourite. Appendix C also reports Common Sense Media's minimum recommended age of viewing.

3.9.1. Programmes by child gender. Boys and girls watch the five most popular programmes equally (see Figure 3.1), with the exception of *Thomas and Friends*, which was watched by significantly more boys (N = 45) than by girls (N = 10), $\chi^2 = 9.27$, $p = .002$.

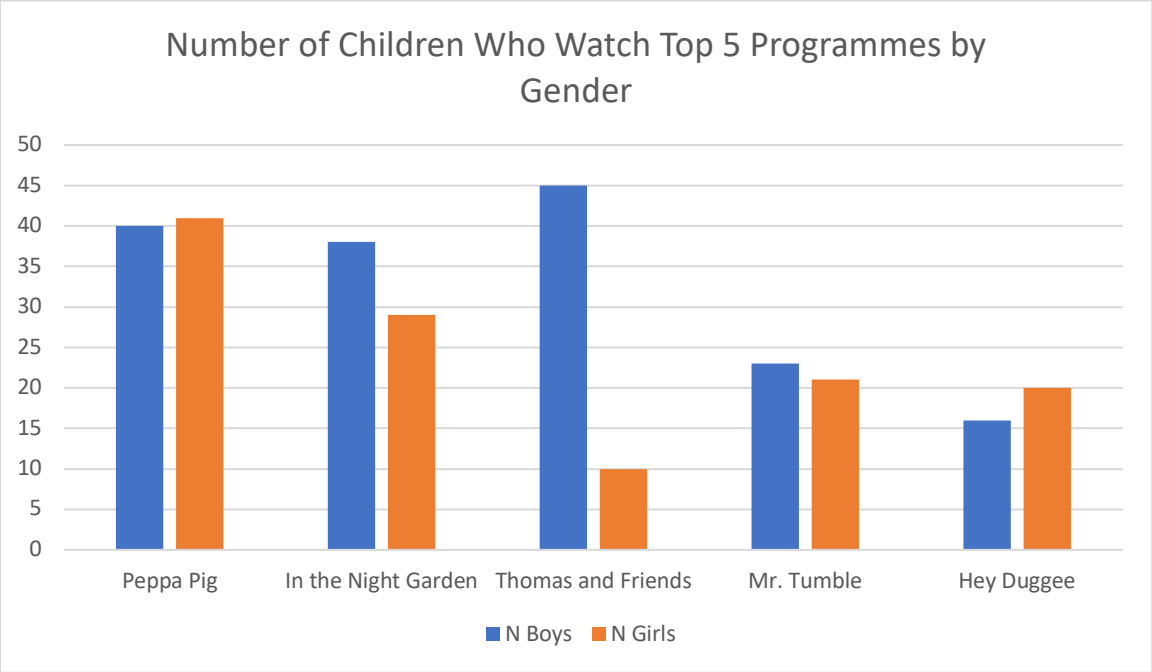


Figure 3.1. A similar number of boys and girls enjoyed the top 5 programmes, with the exception of Thomas and Friends.

3.10. Content and format features in programming

3.10.1. Setting. Most programmes (*N* = 26) took place in natural settings, or in a fantasy land (*N* = 23; see Figure 2 for distribution of settings). 28 programmes had a narrator, 66 were animated, 11 were live-action, and 13 were a mixture. 28 were films and 62 were episodic in nature. Episodic programmes had significantly shorter average scene length (*M* = 71.82 seconds, *SD* = 38.32) than films (*M* = 97.56 seconds, *SD* = 39.04).

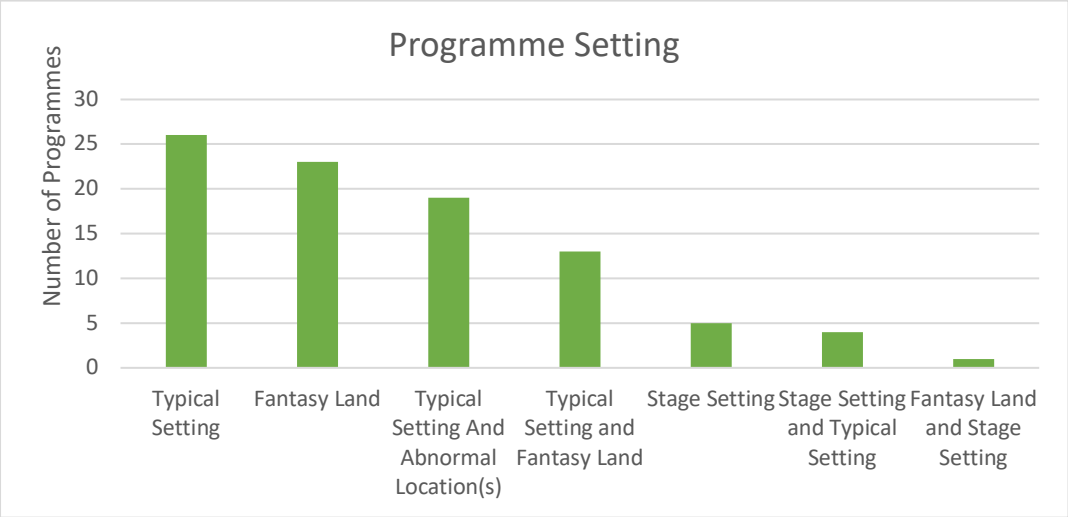


Figure 3.2. Most programmes took place in typical settings (such as homes or schools) and/or in fantasy lands.

3.10.2. Prosocial and antisocial content. Table 3.1 contains descriptive statistics about programme content.

Figures 3.3 and 3.4 show the distribution of antisocial and prosocial behaviours. Antisocial behaviours per minute was re-coded into quartiles to adjust for considerable skewness (skewness = 1.31, standard error = .254) and this new variable was used in analyses. Notably, the top five favourite programmes reflected the general variance in prosocial and antisocial content. Table 3.2 reports these data.

Table 3.1. Descriptive statistics for the full corpus of programmes.

	Mean (SD)	Range
Percentage Conversational Scenes	16.90 (32.74)	0-100
Percent Scenes with Character Music	12.60 (19.13)	0-100
Prosocial Acts / Minute	.58 (.29)	0-1.33
Antisocial Acts / Minute	.35 (.33)	0-1.59
Antisocial Acts / Minute (Re-coded into quartiles)	2.43 (1.15)	1-4

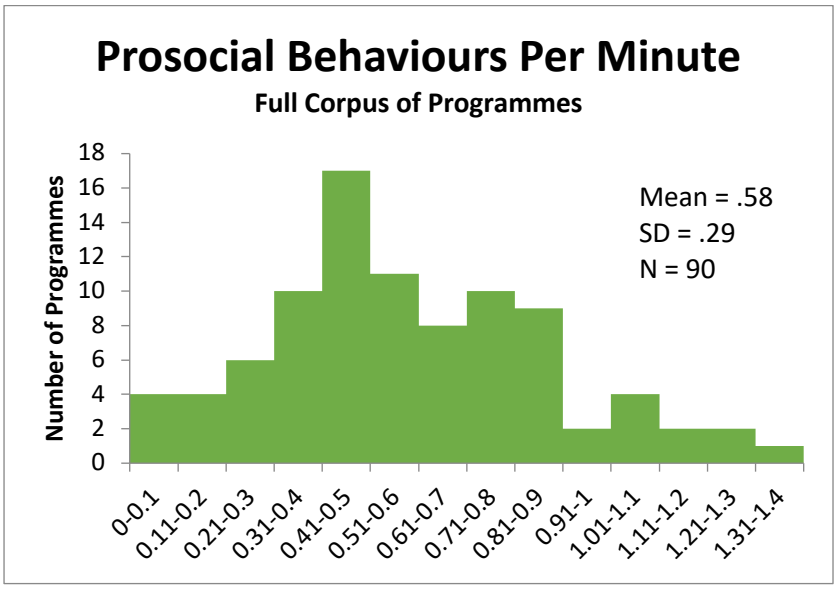


Figure 3.3. There was variation in the number of prosocial behaviours each programme portrayed.

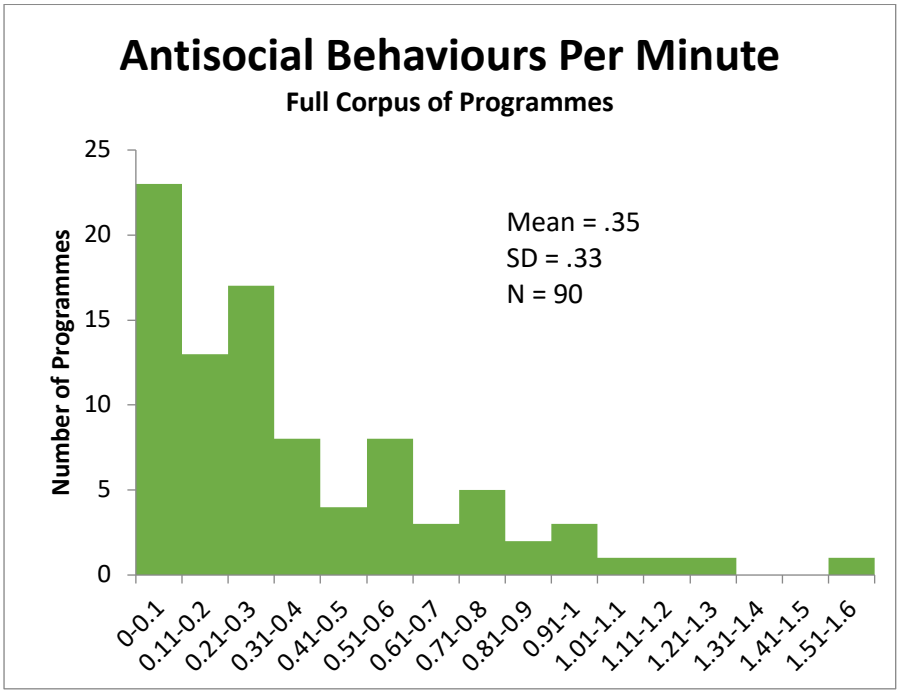


Figure 3.4. The distribution of antisocial behaviours across all programmes reveals that most programmes have few antisocial behaviours per minute.

Table 3.2. The mean number of prosocial and antisocial behaviours for each of the top 5 programmes.

Programme	Mean Prosocial Behaviours Per Minute	Mean Antisocial Behaviours Per Minute
Peppa Pig	.85	.15
In the Night Garden	.28	0
Thomas and Friends	.44	.34
Mr. Tumble	.58	0
Hey Duggee	.68	.11

3.10.3. Associations between prosocial and antisocial behaviours in each programme. Across all programmes, prosocial behaviours per minute were unrelated to antisocial behaviours per minute, $r(88) = -.019$, $p = .856$.The percentage of scenes that had a conversational element was negatively correlated with both prosocial behaviours per minute, $r(88) = -.283$, $p = .007$, and antisocial behaviours per minute, $r(88) = -.452$, $p < .001$. The pace of scenes (calculated as the average length of scene) was negatively correlated with prosocial behaviour, $r(88) = -.245$, $p = .020$, such that longer scenes (i.e., slower pacing) were related to less prosocial behaviour, but unrelated to antisocial behaviour, $r(88) = -.010$, $p = .924$.

3.11. Prosocial and antisocial behaviours by format features

Exploratory analyses were run to establish whether some programme types had more prosocial behaviours than others, since this sort of content analysis is novel and hypothesising differences in content by format feature was not possible.

3.11.1. Prosocial content by format features. One-Way ANOVAs were run to investigate whether animated, live-action, and mixed programmes differed in prosocial

behaviour per minute of action. This analysis showed a significant main effect of animation type on prosocial behaviours per minute, $F(2, 87) = 8.17$, $p = .001$, $\eta_p^2 = .158$; Tukey's post-hoc tests revealed significant differences between animated and live action, $p = .026$, such that there were more prosocial behaviours per minute in animated programmes ($M = .65$, $SD = .27$) than live action programmes ($M = .42$, $SD = .30$). There was also significantly more prosocial behaviour in animated content compared to mixed programmes ($M = .37$, $SD = .26$; $p = .003$).

3.11.2. Antisocial content by format features. For antisocial behaviour, a one-way ANOVA revealed a significant effect of animated, live action, or mixed format on antisocial behaviour, $F(2, 87) = 9.74$, $p < .001$, $\eta_p^2 = .168$ ($M_{animated} = 2.73$, $SD_{animated} = 1.09$; $M_{live\ action} = 1.73$, $SD_{live\ action} = 1.01$; $M_{mixed} = 1.54$, $SD_{mixed} = .88$). *t*-tests revealed that there was more antisocial behaviour in films ($M = 3.25$, $SD = .93$) than in episodic programmes ($M = 2.06$, $SD = 1.05$), $t = 5.12$, $p < .001$, $d = 1.04$.

3.12. Common Sense Media minimum age requirements

64 programmes were coded by researchers and CSM (CSM had rated 66 of the total 107 programmes – two programmes rated by parents were not coded by researchers). Prosocial behaviours per minute was inversely related to minimum recommended age, $r(62) = -.318$, $p = .010$, and antisocial behaviour per minute was positively related to minimum recommended age, $r(62) = .514$, $p < .001$.

Independent *t*-tests were run with researcher-coded prosocial and antisocial behaviours as dependent variables and whether the programme was labelled for children aged between two and three or children older than three was the grouping variable. Antisocial behaviour per minute was also higher in programmes recommended for older children ($M_{older} = 3.18$, $SD_{older} = 1.05$; $M_{younger} = 1.84$, $SD_{younger} = .85$), $t(62) = -5.36$, $p < .001$, d

= 1.31, while prosocial behaviour per minute was higher in programmes rated as acceptable for younger children (M_{older} = .50, SD_{older} = .25; $M_{younger}$ = .70, $SD_{younger}$ = .29), $t(62) = 2.90$, p = .005, d = .73.

3.13. Children's television diets

3.13.1. Content in children's television diets. Table 3.3 reports the descriptive statistics for the content variables (e.g., grand mean of prosocial behaviours per minute and grand mean of antisocial behaviours per minute) and format feature variables calculated per child to compose the television diet variables. Table 3.3 also reports correlations between content and format features.

Of note, prosocial behaviours and antisocial behaviours were very weakly positively related, $r(171) = .155$, p = .042, despite the lack of association shown above within each individual programme. Length of scenes and conversational scenes were negatively related to prosocial behaviours per minute, while the proportion of programmes that were animated was positively related to prosocial behaviours per minute. Conversational scenes were inversely related to antisocial acts per minute, and animation was positively related to antisocial acts per minute. Notably, there was limited variance in how much animation children watched; most children watched a high proportion of content that included animation.

3.13.2. Child gender and screen content. Independent samples *t*-tests were run to test for gender differences in the content variables. There were no gender differences for average prosocial behaviours per minute, average antisocial behaviours per minute, average pace, average proportion of conversational scenes, or proportion of programmes children watched that were animated, ts ≤ 1.56, ps $\geq .147$. χ^2 tests revealed no significant differences in the number of boys and girls who watched with their mothers compared to

those who did not, $\chi^2 = .914$, $p = .339$, and no significant differences in the number of children of each gender who watched with their fathers compared to those who did not, $\chi^2 = .043$, $p = .837$.

Table 3.3. Pearson correlations, means, and standard deviations for children's television diets. N = 173

	1	2	3	4	5	6
1. Grand mean prosocial behaviours per minute	--					
2. Grand mean antisocial behaviours per minute	.155*	--				
3. Grand mean of scene lengths (mean of average length of scenes across programmes)	-.284**	-.079	--			
4. Mean proportion of scenes that are conversational	-.476**	-.555**	.334**	--		
5. Proportion of programmes that have animated content	.196**	.267**	.104	-.536**	--	
6. Proportion of programmes with a fantasy setting	-.144^{+}	.269**	.287**	.022	.336**	--
Mean (SD)	.68(.15)	.21(.13)	75.73 (17.25)	.26(.20)	.83(.19)	.52(.25)

+ p<.06, *p<.05, **p<.01

3.14. Parents' ratings of television programmes

Figure 3.5 reports mean values of parents' responses on the 0-3 scales, and Table 3.4 reports correlations across questions. To ensure parents' ratings were comparable to the objective experimenter coding overall scores, a prosocial composite score was created with the kindness, helpfulness, and good friendship questions, Cronbach's alpha = .839. Figure 3.6 shows the distribution of parents' composite scores of prosociality across programmes.

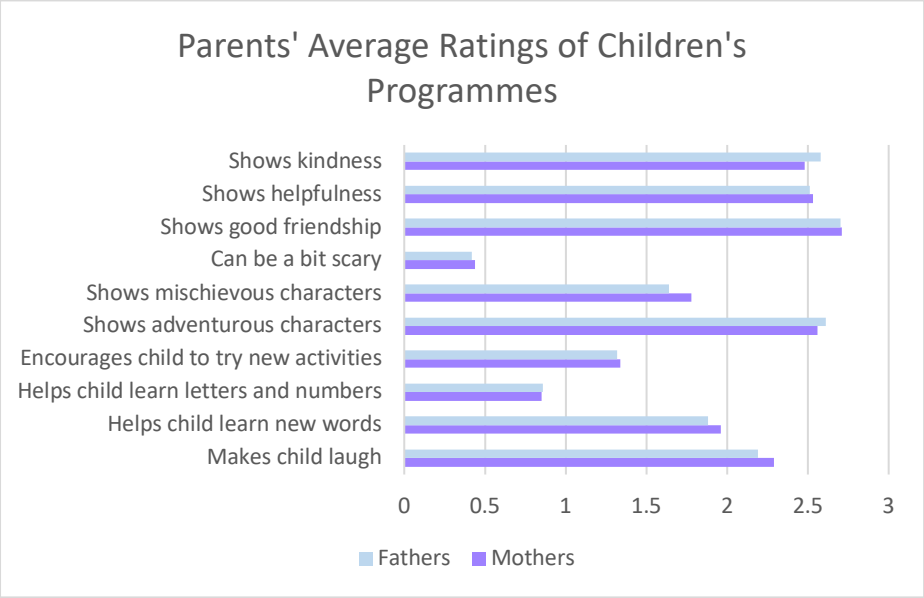


Figure 3.5. On the whole, parents thought programmes had positive messages.

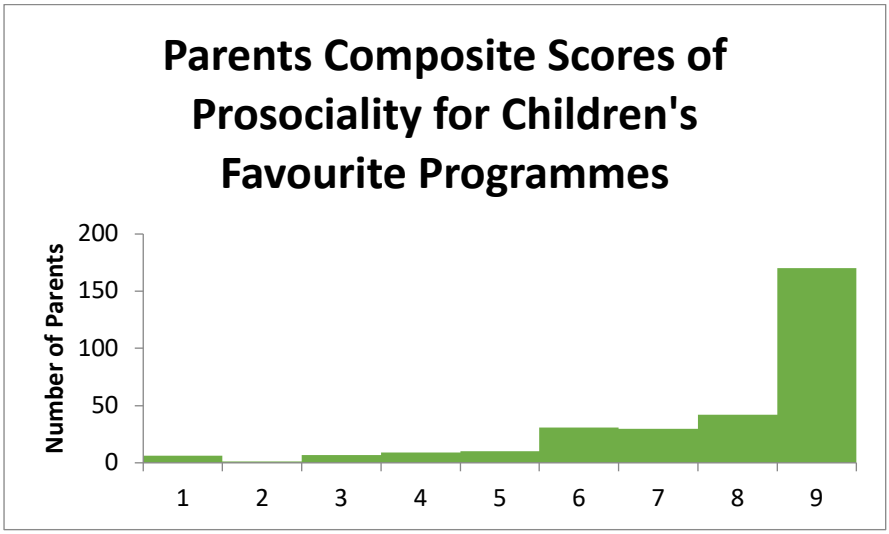


Figure 3.6. Parents think that programmes are largely prosocial (the prosociality composite score for parent ratings included kindness, helpfulness, and good friendship questions).

3.14.1. Parent and researcher ratings. Parents' average responses about how prosocial programmes were and responses to questions about whether the programme was scary or showed mischievous characters were correlated with prosocial acts per minute of action and antisocial acts per minute of action as coded by researchers. Prosocial behaviour as rated by parents (e.g., kindness, helpfulness, and good friendship) was correlated with prosocial behaviour in the same programmes as rated by researchers, $r(50) = .312$, $p = .024$. Parents were not asked about antisocial content directly, but were asked about scariness and mischievousness as a proxy. Antisocial acts per minute marginally significantly positively correlated with parents' average score for whether the programme could be scary, $r(50) = .249$, $p = .076$, and were significantly related to whether characters were mischievous, $r(50) = .409$, $p = .003$.

3.14.2. Parent ratings as a function of whether they watched with their children. To investigate whether all parents were equally good at identifying how prosocial programmes are, correlations were run with the average ratings for each programme by parents who watch some or all programmes with their children (n = 46 programmes) and average ratings for each programme by parents who are always either doing something else in the same room or are in another room (n = 26 programmes). Parents' composite prosocial scores (e.g., combined scores for helpfulness, kindness, and showing good friendship) were only significantly correlated with objectively coded prosocial behaviours per minute for parents who co-viewed with their children, $r(44)_{co\text{-}view} = .363$, $p_{co\text{-}view} = .013$; $r(24)_{child\ alone} = -.167$, $p_{child\ alone} = .414$. These correlations significantly differ from each other, $z = 2.12$, $p = .034$. In contrast, antisocial behaviour was correlated with parent-reports of mischievousness for all parents regardless of their presence during viewing, $r(44)_{co\text{-}view} = .449$, $p_{co\text{-}view} = .002$; $r(24)_{child\ alone} = .538$, $p_{child\ alone} = .005$.

3.14.3. Parent ratings and child gender. Parents' responses were analysed by child gender, and independent *t*-tests revealed no significant differences in parents' composite score for prosocial behaviour, $t(304) = .39$, $p = .699$, whether a programme could be scary, $t(309) = .69$, $p = .492$, or showed mischievous characters, $t(304) = -1.40$, $p = .162$ as a function of child gender.

3.14.4. Common Sense Media minimum age and parents' ratings. Parents' ratings of the five questions of interest and prosocial and antisocial behaviours per minute were correlated with the minimum age Common Sense Media (CSM) recommend for viewing. 37 programmes were rated by both parents and CSM. Parent rated kindness and helpfulness were significantly negatively correlated with the minimum age, $r(35)_{kindness} = -.343$, $p_{kindness} = .038$; $r(35)_{helpfulness} = -.401$, $p_{helpfulness} = .014$.

Independent *t*-tests were run with parent-rated prosocial and antisocial content as dependent variables and whether the programme was labelled for children aged between two and three or children older than three as the grouping variable. Of the parent variables, only how scary parents thought the programme was significantly different between groups, $t(35) = -2.31$, $p = .027$, $d = .78$. Programmes CSM recommended for older children ($M = .91$, $SD = .79$) were rated as scarier than programmes recommended for younger children ($M = .40$, $SD = .48$).

Table 3.4. Pearson correlations for parents' ratings of children's television programmes.

	1	2	3	4	5	6	7	8	9
1. Kind	-								
2. Helpful	.746**	-							
3. Shows good friendship	.617**	.543**	-						
4. Can be scary	-.026	-.014	-.042	-					
5. Shows mischievous characters	.072	.077	.173**	.245**	-				
6. Shows adventurous characters	.473**	.495**	.459**	.191	.338**	-			
7. Encourages new activities	.225**	.220**	.207**	-.089	.053	.252**	-		
8. Helps child learn letters and numbers	.110^{+}	.128*	.005	-.009	-.064	.032	.354**	-	
9. Helps child learn new words	.212**	.145*	.105	.103	.073	.284**	.364**	.332**	-
10. Makes my child laugh	.144*	.089	.157**	.191**	.199**	.153**	.235**	.175**	.217**

+ marginally significant ($p < .06$), *$p < .05$, **$p \leq .001$

Discussion

Detailed content analysis of 90 programmes watched by the sample of 24-month old children revealed several findings. This coding was much more time consuming than the approach used in most research on prosocial television, namely showing children pre-selected programmes, but was a fruitful approach and did allow for a more holistic understanding of children's television diets. First, children were watching a large number of programmes aimed for children, but only a small number of programmes had a very wide reach. The number of prosocial and antisocial acts varied across programmes and by programme type. Overall rates of prosocial and antisocial behaviours per minute were unrelated, but the average frequency of prosocial and antisocial behaviours children were exposed to in their television diets did relate. Second, there were large individual differences in content across children's screen diets, but within individuals, children appeared to watch programmes that have particular characteristics. For the most part, boys and girls watched the same programmes and were exposed to the same amount of prosocial and antisocial content. Parents were generous in their ratings of the prosociality of television programmes, but their ratings were largely unrelated to the detailed objective prosocial coding if they did not watch with their children. Parents' answers to questions about antisocial themes were more in line with the objective coding than their ratings of prosocial themes. In addition, parents who co-viewed with their children were better at rating prosocial behaviour than parents who never co-viewed, whereas all parents were good at rating antisocial behaviour. Each of these findings will be discussed in turn.

3.15. What children are watching

3.15.1. Variety of programmes. Highlighting the breadth of programming available to families, this sample of 180 twenty-four-month old children were watching 107 different

programmes and films. The high number of programmes children watched highlights the importance of researching regular content in addition to how specific content influences behaviour. A few programmes, such as *Peppa Pig* and *In the Night Garden* appeared particularly popular, but 35 programmes were each viewed by only a single child in the sample. The top five programmes are all watched by a large proportion of the sample, four of which are watched by just as many boys and girls. The one exception is *Thomas and Friends*, which is watched more often by boys. This trend suggests that most programmes at this age are not reaching boys and girls differently, so children are likely getting the same messages regardless of gender. The lack of significant gender differences is discussed further later in this chapter. Of the top five programmes, three are CBeebies-created/produced, and two are created by large international companies. This points to the globalisation of children's media Potter and Steemers (2017) describe – researchers can no longer afford to only test the effects of the most popular local television programme(s).

3.15.2. Age-appropriateness of programmes. Of note, Common Sense Media had reviewed 66 of the nominated 107 programmes and films that the children in the current study watched and were coded by the study team, and only three of them (*Mickey Mouse Clubhouse, Teletubbies*, and *Timmy Time*) were rated for children aged two (some *Sesame Street* episodes were rated for age two-years and above- this programme was watched by children in our sample, but was unavailable in the UK at the time of coding). The recommended minimum age of viewing ranged from two- to 12-years; 23 programmes were given a minimum recommended age of three-years, and none of the full-length films had a recommended age lower than five (Media, 2019a, 2019b). This highlights a discrepancy between what children are actually watching and what guidelines say they should be watching. Since children are watching programmes that are widely available and films that

are new and popular, these statistics also highlight how few programmes are aimed for children under age three. More content that is not only appropriate for younger children, but also targeted toward and helpful to toddler viewers is needed.

3.16. Programme characteristics

3.16.1. Format features. There were a variety of settings for programmes, but most took place either in settings where children might find themselves (e.g., a home, a school, a supermarket) or in fantasy lands, in almost equal measure. In addition, the number of programmes that included typical and abnormal settings was relatively high. These results contrast with those in the Linebarger et al. (2017) study, which found that for programmes for younger children, 42% of scenes were in a highly familiar context and 22.4% took place in a context that would not be familiar (the remaining 13% had no setting). The difference in our finding may have to do with the inclusion of full-length films, which often take place in fantasy lands.

The mean percentage of conversational scenes is low, suggesting that many programmes are not utilising all of the available strategies to minimise the transfer deficit. Conversational partners built into programmes help to decrease the transfer deficit by adding labels to things (e.g., Zimmerman et al., 2015) and active questioning of the viewer (e.g., Linebarger et al., 2017). It may be beneficial for programmes to utilise conversational elements more often. This will be further explored in Chapter 5.

One third of the analysed content was film content, which had longer scene lengths, on average, than the remaining episodic television programmes. Films have a longer amount of time to give a full narrative arc than one episode of a television programme (some of which were only 7 minutes long); therefore, this difference is not surprising. However, the difference in pace between formats might affect attention (Anderson &

Pempek, 2005) and/or comprehensibility (Wright et al., 1984) in contrasting ways. It could be that films are more easily comprehended, but fast-paced television programmes are better for keeping children's attention, which might, in turn, decrease the transfer deficit in a different way. In addition, compared with specific episodes of an episodic programme, films are more likely to be re-watched, which might also decrease the transfer deficit (Barr, 2013).

3.16.2. Prosocial and antisocial behaviour in the full corpus of programmes. Most programmes portray at least some prosocial behaviour and some antisocial behaviour, with the balance typically in favour of prosocial behaviour. The prevalence of prosocial behaviour contrasts with Linebarger et al.'s (2017) finding. This is likely due to the focus of their research on academic programming contrasting with our overall sweep of what children watched. Some programmes are more narrative-focused and therefore might have fewer scenes about letters and numbers but have more opportunities for characters to relate to each other in prosocial ways.

3.16.3. Prosocial and antisocial content by format features. There were several differences in the prevalence of prosocial and antisocial behaviour based on the way programmes and films were presented. Animated programmes had more prosocial and more antisocial behaviours than any other format. This may be due to animated stories, especially films, being more about heroism and including more antisocial behaviour that requires remedying. In addition, several antisocial behaviours may have been double-coded as prosocial behaviours, if they served to save someone or were done in cooperation. For example, there is a lot of cooperative aggression in *Beauty and the Beast* when the house objects attack the townspeople when they come to kill The Beast. This would have all been

coded as aggressive behaviour, but several behaviours would have also been considered cooperative and prosocial as they served to save The Beast.

Though conversational formats can facilitate learning from screens (e.g., Zimmermann et al., 2015; Linebarger et al., 2017), there was a relatively low amount of outright conversational techniques. Interestingly, the percentage of total scenes that had a conversational element was negatively related to both prosocial and antisocial behaviours. This might be because conversation is often used for more pedagogical goals such as letter- or number-learning, and so programmes that are highly prosocial or antisocial might be ones that are more focused on narrative and less on academic content.

The pace of programmes was related to prosocial behaviour in the overall corpus such that programmes that had shorter scenes (quicker pace) had more prosocial behaviour. Shorter scenes may be better attended to and therefore the higher amount of prosocial modelling in programmes with shorter scenes may be positive. In contrast, slower-paced programmes may be better comprehended and therefore recalled and mimicked. Due to the higher prevalence of prosocial content in higher-paced programming and the need for children to attend to learn, it is likely that faster-paced programming will be associated with more prosocial behaviour.

In contrast to Mares and Woodard (2005) and Linebarger et al. (2017), there was no association between the prevalence of prosocial and antisocial behaviours in the overall corpus of programming. This surprising finding suggests that some programmes might be very prosocial and some very antisocial, rather than programmes always following one with the other. Importantly, a negative correlation between prosocial and antisocial behaviours was not found, highlighting that programmes can have both varieties of behaviour, some of which might even co-occur. One common example of this is cooperation and aggression.

Often, a group of characters, such as the trucks in *Dinotrux* will work cooperatively to fight an aggressor with more aggression. This type of scenario is modelling both positive and negative behaviour, and might be confusing to children and/or encourage a variety of imitable behaviours, such that children mimic both positive and negative behaviours from programmes. Alternatively, programmes might follow antisocial behaviour with prosocial behaviour, as suggested by previous researchers. The lack of association between prosocial and antisocial content within the broad corpus of programming further demonstrates the variety of programmes available to and consumed by children and the need to identify what is best for their prosocial development.

3.16.4. Common Sense Media and researcher ratings. The minimum recommended age of viewing was related to researcher ratings in expected directions. When age of viewing was considered in a more dichotomous manner – either for toddlers (two- or three-years) or older children, similar patterns emerged for prosocial and antisocial behaviours per minute. Parent variables were not as strongly linked with these categories, with the exception of how scary parents rated content. This is important for parents to consider; children may not have the emotional maturity needed to handle frightening screen content at age two, especially not content created to frighten older children. In addition, if children are watching without the comfort of a parent, scary content may be even more detrimental without an emotion regulation scaffold.

3.17. Children's television diets

3.17.1. Prosocial and antisocial content. The content input that children receive varies widely. It appears that though most children viewed around .7 prosocial acts per minute (around 21 acts in half an hour of content – the length of many episodes) and around .2 antisocial acts per minute (around 6 acts in half an hour of content), some

children are watching highly prosocial or highly antisocial content across all of their content. Indeed, although there is no correlation between programmes' prosocial and antisocial content when considering programme characteristics alone, when grand mean of prosocial content is calculated per child, there is a positive correlation between prosocial behaviour and antisocial behaviour. This suggests that some children are watching a diet of content that is highly involved with a lot of action, perhaps more prosocial action in some programmes and more antisocial in others, and that other children are watching more of the programmes that have little plot, perhaps some of the educational or less story-driven programmes. Therefore, the contrast between the two associations is not as striking as they may appear on the surface; however, it is important to consider that children who are watching more prosocial content are also watching more antisocial content, and there may be implications for behaviour.

3.17.2. Format features. Format features of programmes did cluster together, however not consistently enough to create latent variables. The distinct nature of each of the format features highlights the fact that television programmes and films are all unique, and children's diets of content are as unique as they are. Indeed, a child could enjoy both *Mr. Tumble*, a live-action, conversational programme without much overt prosocial behaviour as well as *Sleeping Beauty*, an animated film with a narrator and numerous valiant prosocial acts, whereas another child might prefer only live-action programmes that differ only in conversational tone. Understanding this diversity is important for considering screen time's impact on children's behaviour; researchers can no longer afford to investigate how one programme influences direct behaviour, as this programme may be lost in a wash of different content.

3.18. Child gender

There were no significant differences in any of the content variables by child gender; this is contrary to expectation and suggests that the gendered screen choices that are seen in older children (e.g., Cherney & London, 2006; Coyne, Linder, Rasmussen, Nelson, & Birkbeck, 2016) are not yet distinct at age two. Gendered differences in content choices increase with age from five- to 13-years (Cherney & London, 2006), but are manifest by age five. Therefore, there is likely an increase in children watching gendered content between ages two- and five-years. This increase may be influenced by parent gender socialisation and other environmental factors such as targeted marketing of programmes and programme-related merchandise. As children get older, they may also begin to talk about programmes with same-sex peers and increase their gendered programme watching.

Importantly, significantly more boys did watch *Thomas and Friends* than girls, suggesting this sort of targeted marketing is already occurring. Of the top five programmes, *Thomas and Friends* did have the most gender-stereotyped content – there are vehicles, a lot of action, and most of the characters are male. In addition, several fathers revealed in the technology interview that they remembered watching *Thomas the Tank Engine* as children, and so watching with their sons was nostalgic. The 'masculine' content in *Thomas and Friends* contrasts with programmes such as *Mr. Tumble* where children of both genders are portrayed doing everyday things. *Peppa Pig* may be considered a more feminine programme since the main character is female and the pink is constantly plastered across the screen, but the content is about characters doing everyday things, and there are cars, cowboys, and football games, which are more male-stereotyped. However, *Peppa Pi*g merchandise is targeted more at young girls. A brief search of merchandise for boys revealed a smaller selection that features Peppa's brother George more than Peppa. The

lack of gender differences could be due to a trend to create programmes that do not contain a high amount of gender-stereotyped behaviour and programmes that have many characters of both genders. For example, *Paw Patrol* added a second female character to the main group of pups in the second season which helps address the gender imbalance of a mostly male-led cast of characters.

Child gender had little bearing on how parents rated programmes. This finding is in line with the overall lack of association between gender and programme characteristics. Parents did not pick up on more or less aggression or prosociality based on the gender of their child, suggesting that they do not assume their sons' programme choices are more antisocial than their daughters'. This finding is slightly different from Endendijk et al.'s (2014) finding that, when parents and children were reading a book laden with gender stereotypes, mothers said more positive things about picture book characters that engaged in gender-stereotyped behaviour than characters who did not, and fathers with multiple sons were more positive about boy characters' naughty behaviour than other fathers. Importantly, parents are responsible for choosing content for their toddlers, so the lack of gender differences here suggests that parents are not choosing programmes based on gendered themes. Due to the large variety of programmes rated and the low frequency of parents who rated each programme, we were unable to look specifically at programmes that portray stereotyped behaviour. Future research should investigate whether parents' ratings differ by programme and whether these gender effects are more evident in programmes with characters who engage in stereotyped behaviour.

3.19. Parents' ratings of television programmes

On average, parents rated television programmes highly in prosociality. Of note, the questions that ask about prosocial behaviour (shows children being kind, being helpful, and

being good friends) have large negative skews, indicating that most parents thought most programmes showed these traits.

Parents' ratings of prosocial behaviours clustered together, supporting a view that parents might have a global positive view of many programmes. However, none of the prosocial ratings were related to scariness ratings, highlighting that programmes may include both positive, prosocial behaviours and aggressive or scary behaviours, but do not always include both – the lack of association here suggests that there is no systemic way programmes include positive and negative behaviours. Good friendship was positively correlated with mischievousness ratings. This may be due to storylines resolving mischievous behaviour with good friendship, and/or may be due to some characters working together to get into mischief. Parents who rated scariness more highly did also rate mischievousness more highly. This may suggest a similar phenomenon to prosocial behaviour – some programmes may be seen as having more overall negative characteristics. This association was, however, much weaker than the cluster of prosocial behaviours.

3.19.1. Parent and objective ratings. Parents' composite ratings of prosocial responses were moderately related to objective ratings of prosocial behaviour. This suggests that parents are at least somewhat aware of prosocial content. Notably, parents were rating from memory and are likely not watching these programmes looking for kindness, helpfulness, and good friendship, whereas objective coders were trained and primed to be looking for these things.

3.19.2. Parent ratings by type of behaviour. Compared to prosocial behaviour, parents are more in tune with how antisocial programmes are; the overall number of antisocial acts was positively related to how mischievous parents rated the programmes. This is particularly interesting because mischievousness may include physical or verbal

aggression and may include acts that are not necessarily scary. For example, *Cinderella* is not a very aggressive film, but Cinderella's stepmother and stepsisters use a lot of insults and threats. In contrast, *Cars* is highly aggressive, with several instances of charging and crashing, but is a relatively upbeat and was given a rating of 0 for scariness by parents; *Cars* was rated a 2 (out of 3) on average for mischievousness. In addition, parents' perceptions of the scariness of programmes was trending toward being significantly related to objectively coded antisocial behaviour. The strength of this association may be a bit weaker than mischievousness because of a discrepancy between what is considered antisocial and what is considered physically aggressive and frightening. Furthermore, scariness may be less related to actions in a scene and more related to the context of a scene; no one needs to act aggressively for a dark forest to be frightening.

3.19.3. Parent ratings by whether they watch with their children. Not all parents were equally good at detecting behaviours. When correlations were investigated separately for co-viewing (N = 221) and non-co-viewing parents (N = 88), only parents who co-viewed with their children some or all of the time had ratings that were significantly related to objective ratings of prosocial behaviour. This suggests that parents are not always aware of the prosocial content in programmes, or may assume that some programmes are more prosocial than they are if they do not watch them with their children. In contrast, parents were reasonably good at identifying mischievous behaviours even when they did not watch with their children. This may be because antisocial behaviour is more overt when listening to a programme in another room or that children are upset by antisocial behaviour and seek comfort.

This trend mirrors the agreement between objectively rated antisocial behaviour and parent-rated mischievousness, and therefore suggests that parents may just be better

at identifying antisocial behaviour than prosocial behaviour. Indeed, Cheng et al. (2017) investigated how well parents and teachers agreed on the Strengths and Difficulties Questionnaire for a sample of 4,894 six- to 11-year-old children, which asks about prosocial and antisocial behaviour. Parents and teachers agreed more on the hyperactivity subscale (*r* = .48) and the conduct problems subscale (*r* = .40) than on the prosocial scale (*r* = .24)[4]. This finding suggests that raters are better at identifying antisocial behaviour than prosocial behaviour. Therefore, parents may just simply be better at identifying and recalling the negative acts than the range of prosocial acts. Parents may simply see positive behaviour on screen and rate programmes highly rather than understanding the underlying variance in behaviour, whereas, with antisocial behaviour, the variance may be more striking and/or parents may pay more attention to how antisocial a programme is before allowing their children to watch the programme.

3.19.4. Common Sense Media minimum age and parent ratings. As well as researcher ratings, the minimum recommended age of viewing was related to parent ratings. Programmes with a lower recommended minimum age were rated as more kind and helpful by parents and high more prosocial behaviours per minute as coded by researchers. This is promising, as it suggests that programming created for younger children portrays developmentally appropriate content and content that may help with learning goals appropriate for younger ages, such as kindness. This does, however, suggest that television created for older children is less prosocial, which may mean that older children are not getting good prosocial content, nor, indeed, are the two-year-olds watching content created for older children. In addition, antisocial behaviour per minute increased with the

[4] *p* values were not reported in the original article, but all correlations are presumed to be significant. The effect sizes are more of interest here.

recommended minimum age. This is important for parents to consider when evaluating whether or not their children are ready to view this content. Though some children may be able to comprehend certain concepts and may prefer content created for older children, watching this content may have an unintended consequence of antisocial behaviour exposure.

Conclusions

Rigorous coding of the content children watch is possible, and there is a wide range of programmes children watch at age 24-months. Most of what 24-month old children watched was not ostensibly created for them, though those created for younger children do have more prosocial content. Only a few programmes were very popular; and quite a few programmes were only watched by one or two children, highlighting the vast collection of media available. Some of the variance in prosocial and antisocial content was explained by various programme characteristics, such as animation and conversational techniques. In each programme, prosocial and antisocial content was unrelated. However, on the individual television diet level, children who watched more prosocial behaviours per minute also watched more antisocial behaviours per minute, though this association was significant but weak. Shorter scene length was related to more prosocial content. The associations between format features and children's behaviour, as well as whether children's content is related to their behaviour will be discussed in Chapter 5.

Parent reports did not accurately reflect the nuanced variance in prosociality across programmes. Parents were, however, better at establishing which programmes were more antisocial. On the whole, boys and girls appear to have similar viewing experiences, and parents' ratings did not differ by gender, suggesting parents may not be looking for gender-stereotyped behaviour in programmes.

Chapter 4. A Digital Home: Technology Patterns in the Homes of Toddlers and Parents' Intentions and Rules Around Screen Use

Technology is now pervasive in the lives of children everywhere, offering a potentially stronger influence on children's thoughts and behaviours than ever before. When the iPhone was introduced in 2007, advertisements highlighted the historical significance of a phone that could "do it all" as they paraded telephones throughout history. Since then, smart phones, tablets, and other devices have provided information and entertainment for all ages at all times and places. Technology may impact multiple aspects of children's social lives (e.g., prosocial behaviour; Mares & Woodard, 2005) and health outcomes (e.g., adolescent sleep; Hale & Guan, 2015; adolescent obesity; Ekelund, et al., 2006) such that understanding its use is a pressing research challenge. For example, once researchers and content creators know how families use technology, realistic guidelines can be created to ensure that technology use has a positive influence on family life. With this in mind, the current chapter aims to investigate: 1. the quantity, context, and individual stability of early screen time, 2. parental intentions around and rules about screen time, and 3. links between the two.

4.1. General screen usage

Guidelines in the UK have been largely non-existent until this year (2019), when a guide for parents and clinicians was released. This guide suggested that the right amount of screen use for children was likely to vary according to the family context (Royal College of Paediatrics and Child Health, RCPCH). Until recently, experts at the American Academy of Pediatrics (AAP) recommended that children under age two engage in no screen time (American Academy of Pediatrics, 1999). The more recent AAP guidelines (AAP, 2016) still recommend little screen exposure for very young children. In addition, the World Health

Organization published guidelines in April (2019) that recommend no sedentary screen time for children under two, and no more than an hour a day for two- and three-year-olds, carefully saying that even less is a better choice (World Health Organization, 2019).

However, patterns of parental behaviour suggest that parents ignore these guidelines; Beyens and Eggermont (2014) found that of a sample of 844 children aged six-months to six-years old, 96.3% watched television on a regular basis. Likewise, combining studies in Northern Ireland and the USA led to an estimated 70% of infants and toddlers using a touch screen daily (Barr & Linebarger, 2017). Importantly, touch screen use in early life appears to be mostly passive; children appear to be watching videos rather than interacting with games and applications. For example, Cristia and Seidl (2015) investigated how often children were playing with interactive puzzles on touch screens at different ages. They found that at eight months old, children were not playing puzzles at all—touchscreen use was all sound/image baby apps, pictures, or videos. By 18 months, fewer than a quarter of children were using touchscreens for puzzles (rather than using screens for only passive viewing), with an increased number as children got older, with the most usage at 32 and 35 months of age. Importantly, as this increase in puzzle playing happened, using touchscreens for video and/or photographs was still popular. Children were, however, able to engage in some interactive gestures on the touchscreen, the simplest being banging, at all ages. As discussed in Chapter 3, interactive screen use may help children learn better from their screen time. Understanding what children are able to engage with interactively will help content creators decrease the transfer deficit from 2D screens to 3D real life by incorporating interactive tools that are age-appropriate into their products.

Since caregivers regulate behaviour in early childhood, parents' self-efficacy at restricting screen exposure is important to consider. Patterns in parental limitations may

also inform how well viewing guidelines are being heeded. Hnatiuk, Salmon, Campbell, Ridgers, and Hesketh (2015) found that 30% of mothers reported their self-efficacy in enforcing television bans decreased over time, and only 20% had consistently high self-efficacy between nine- and 24-months. In a growth curve model, the children with mothers who had high self-efficacy for enforcing bans watched less television (β=-35.5 95% CI (-54.4,-16.6) for high self-efficacy, β=-37.0 95% CI (-54.4, -19.7) for increasing self-efficacy, and β=-2.6 95% CI (-22.9, 17.7) for decreasing self-efficacy; Hnatiuk et al., 2015), further highlighting that when screens are in use, parents may not feel able to follow guidance regarding limiting screen time. This finding could also be evidence for rules working – parents who set rules and are confident about keeping to them do have children who engage with less screen time. Parents may struggle to keep to these rules for a number of reasons. Courage and Howe (2010) argue that the media industry appears keen to encourage viewers to regard children's television programmes as educational and informative. These messages might encourage screen use or inhibit the efficacy of guidelines; especially if parents are using screens to keep their children occupied, advertisements for educational screen time may be particularly effective at reassuring parents that screen time is not necessarily all bad. Crucially, though, little work has been done to establish whether parents are setting guidelines in recommended ways, and whether these limits change as children get older. This chapter will investigate how parents set rules and limits and whether they have bearing on children's screen time quantity.

Though studies and policy-makers have illustrated the high prevalence of technology use in childhood, less is known about stable individual differences in usage. In a study of 404 children aged one- to four-years, Beyens and Eggermont (2017) found that whether children were exposed to television at one time point predicted the amount of television they

watched six months later (β = .67, p < .001). Though this finding does suggest some longitudinal stability, it is only over six months and the age range is wide. Xu, Wen, Hardy, and Rissel (2016) also investigated longitudinal screen use, finding that daily screen use when children were one-year-old predicted screen time when children were two-, three-and-a-half-, and five-years old in a sample of 667 families. For every additional hour children watched at one-year, there was a 15-minute increase on weekdays and 18-minute increase on weekends on average across ages two- to five-years. Importantly, this study only looked at associations between screen time at one-year-old and subsequent time points, and did not investigate increases between each time point. Longitudinal trends are under-studied. Barber et al. (2017) did investigate changes across time-points, finding that screen time increased from 12-months to 18-, 24-, and 36-months of age. The increase was dramatic between 12- and 18-months, increasing from 56 mins a day at 12-months old to 1.28 hours at 18-months – a 36% increase in six months. By 24-months, children were watching 1.71 hours of television a day, and at 36-months, 2.08 hours. In this important study, 1,558 mothers with diverse backgrounds answered survey questions about technology use. The current study aims to continue this good work by including fathers' reports in order to assess inter-rater reliability. Beyond these studies, though other research has investigated longitudinal impacts of screen time (e.g., Hnatiuk, et al., 2015), longitudinal reports of quantity of screen use is scarcely reported. Noting individual differences and the stability therein is necessary for a full understanding of how technology use affects development. If screen use varies at different ages in a normal pattern, it could be that only developmental outcomes for which that age is critical are affected. Contrarily, if screen use increases with age and the same children are engaging with screens more often, development would be impacted in a more holistic way. The current study aims to elucidate some of these

questions by utilising a longitudinal approach to investigate individual differences in screen time across three time-points.

4.2. Context of screen use

All time spent in front of a screen is not created equal. 48.1% of parents disclosed that they put their nine- and 14-month-old children in front of the television when they were doing something else (Hnatiuk, et al., 2015). This trend reflects the increased prevalence of digital devices and suggests that screen time is not only becoming ubiquitous in family life, but also that children are often unaccompanied when exposed to screen time. This is an important consideration, as the context of screen time is important when considering its effects. Though studies have shown that children are able to learn skills from television modelling (e.g., Lauricella, Barr, & Calvert, 2016), there is a substantial transfer deficit in learning from screens even at age two (Zimmermann et al., 2015). Parental presence during screen viewing may help to decrease the transfer deficit in learning from television. Even at 15- to 16-months of age, the quality of parent-child interactions during screen use predicts better transfer learning (interactional quality created as a composite of various features of dyadic interaction, $B = 3.02$, $p = .01$). This is, however, bidirectional – it requires input from both parents and children to be effective (Zack & Barr, 2016). Indeed, Linebarger and Vaala (2010) wrote in a review paper that babies who watched content with competent co-viewers had increased language learning from screens. Thus, in the right context, screen time could actually be beneficial. In contrasting viewing conditions, such as when children are exposed to adult-directed content, screen time may be harmful, although the adverse effects may be indirect. For example, adult-directed television, which can be understood as background television, has been shown to take parents' attention away from children and may even affect language development (Pempek, Kirkorian, & Anderson,

2014). Therefore, when investigating the screen environment of the home, it is vital to consider the context in which children are engaging with screen time.

4.3. Attitudes and intentions around screen use

Parental attitudes toward screen time might influence the quantity and quality of screen time. Lauricella, Wartella, and Rideout (2015) asked parents of zero- to eight- year old children whether they believed television, computer, and mobile devices had a mostly positive or negative effect on their children at their current ages. As would be expected, for children under five, parents with more positive attitudes toward media had children who watched more television and used the computer more often. Likewise, Hamilton, Spinks, White, Kavanagh, and Walsh (2016) found that parents' attitudes toward restricting screen time predicted their intentions to limit screen time for two- to five-year old children to an hour or less per day. In particular, believing that these restrictions would improve children's wellbeing strongly positively predicted intentions to limit screen time ($r = .42$, $p < .001$). Believing that restrictions would promote healthy habits in their children moderately positively predicted intentions to limit screen use ($r = .39$, $p < .001$); in contrast, believing restrictions would increase parental distress moderately negatively predicted intentions to limit use ($r = -.24$, $p < .01$). In addition, what parents believed their partners and friends thought about screen time restrictions resulted in higher intentions to limit use. These findings highlight the importance of helping parents understand the risks and benefits to screen time since this understanding has some bearing on behaviour, as well as informing people about real social norms in effecting change of habits. These findings suggest that parents' attitudes about screen use are important predictors of screen usage, so understanding how parents feel about screen time, and what influences those attitudes, may help groups such as the RCPCH and the AAP give parents information and advice that

will be salient and heeded. The current study aims to address these concerns by asking parents about their attitudes toward their children's screen time at three time-points by attempting to understand intentions around use and investigating whether these attitudes are related to children's screen usage.

4.4. Measurement of screen use

As noted, screen usage is pervasive and varied, and therefore is not an easily manipulated variable, especially since guidelines suggest any screen use could be detrimental to young children and it would be unethical for researchers to require children to engage in screen time. Therefore, researchers must endeavour to measure screen usage as it naturally occurs, which is a difficult task. As a construct, screen time might constitute different things for different groups of people, especially when considering toddlers and young children who may be engaging in screen time whilst playing or passively as their parents are viewing adult-directed content. They could also, of course, be sitting and watching an entire programme. In addition, researchers must rely heavily on parent reports of child screen use. Some studies (e.g., Barr et al., 2010) have utilised screen usage diaries to establish how much screens are used in the home. This method is arguably the most ecologically valid, as it does not rely on parents' ability to summarise media usage. However, due to the current study's positioning in a large framing study, a screen usage diary was viewed to be unduly burdensome and was therefore deemed unethical.

4.5. Current study

Despite families' seeming disregard for guidelines that children under age two should not be exposed to screens, most television research has focused on children aged three and above, or on infants. In addition, little is known about the longitudinal stability or lack thereof in screen usage in toddlerhood and early childhood. The current study aims to

answer some of the questions around screen time before age three by investigating quantity and context of screen use at 14-, 24-, and 36-months and parental intentions and rules around this screen usage. Importantly, this longitudinal approach adds valuable insight into the lives of children growing up in an increasingly digital world. In addition, the availability of reports from mothers and fathers allows for a more robust understanding of children's screen usage and increases the reliability of screen time measurement. This chapter will answer three main questions:

1. How much screen time are children engaging in at each time point, and is there stability of individual differences?

2. What is the context of screen use – when are children watching, and are parents watching with them?

3. What are parents' intentions for and time limits around screen time, do mothers and fathers agree, and are these attitudes and rules different for parents of children who engage in more screen time?

Method

4.6. Participants

Mothers and fathers completed an online questionnaire about their children's technology use when their children were approximately 14-months old (T1, M_{age}(191) = 14.42 months, *SD* = .59), 24-months old (T2, M_{age}(187) = 24.29 months, *SD* = .85), and 36-months old (T3, M_{age}(170) = 36.25 months, *SD* = 1.08). 164 mothers and 157 fathers completed questionnaires at T1; 172 mothers and 173 fathers completed questionnaires at T2, and 153 mothers and 106 fathers completed questionnaires at T3.

4.7. Measures

4.7.1. Technology questionnaire. Parents reported the amount of time children watched television and used other technology (e.g., touchscreens and computers) on weekdays and weekends. Parents were asked to indicate how many hours (choosing from not used, less than or equal to 30 minutes, 30 minutes to an hour, one to two hours, three to four hours, or greater than or equal to five hours) their child spent engaging with TV or DVDs, computers, books, and touch screen devices per day. These answers were transformed to the numerical value in the middle of the range and summed. Mother and father reports were quite similar (T1, $r = .439$, $p < .001$; T2, $r = .475$, $p < .001$; T3, $r = .610$, $p < .001$), so an average daily screen time, using mother and father reports for average weekday and weekend time was calculated for the 161 children at T1, 180 children at T2, and 127 children at T3 whose parents responded to the online questionnaire. If only one parent responded to the survey, responses were included from the one respondent (at 14-months, 13 children had reports from only mothers and 10 children had reports from only fathers; at 24-months, six children only had reports from mothers, and nine children only had reports from fathers; at 36-months, 24 children only had reports from mothers, and four children only had reports from fathers).

Parents were also asked to report their reasons for allowing television use by ranking the following 1-3: “educate them,” “calm them down when they’re upset,” and “keep them busy while I get things done.” Parents were also asked whether they enforced time and content restrictions. In addition, parents were asked how often they enforced time limits on a four-point scale that included never, sometimes, often, and always. These questions were inspired by Valkenburg, Krcmar, Peeters, and Marseille (1999).

4.7.2. Technology interview. The same technology interview introduced in Chapter 3 was used to establish the quantity and context of screen use at 24-months. Interviews

included questions about what, when, and with whom children were engaging during screen time (see Appendix B for the full set of questions). This chapter will focus on when, how much, and with whom children were watching screens, as well as parents' intentions, attitudes, and rules around screen time. Parents' answers were audio recorded and I and an undergraduate coder listened to the recordings and recorded parents' responses. Responses around rules and attitudes around screen time were examined and combined into categories, as reported below.

4.7.3. Parents' childcare hours. At the 14- and 24-month visits, one parent (counter-balanced) was asked to report who was taking care of their child in each of 14 blocks (morning and afternoon/evening of each day). It was possible to report that multiple people were caring for their child in any one block. The proportion of blocks each parent was caring for their child was calculated as a proportion of childcare variable.

4.8. Analysis plan

To address the first main question about how much screen time children were engaging in and the second question about the context of screen usage, all variables were analysed for simple descriptive statistics. Though touch screens were used by a number of children, variability was low and interview data suggested most usage was for passive watching than for active game play. Therefore, touch screen usage was included in the overall screen time variables and descriptive statistics will be reported, but parents' attitudes toward touch screen use will not be further investigated. Next, bivariate correlations were run to investigate the stability of individual differences in amount of screen use across the three time-points.

Next, to understand parents' reasons for and rules around their children's screen usage, Chi-squared tests were run to determine whether parental reasons around allowing

screen usage are significantly different from chance. Following this, McNemar tests were used to establish whether parents' reasons changed over time and whether they differed by parent. Next, chi-squared tests were used to determine whether parents' reasons for allowing screen usage differed by their children's amount of screen use. Finally, difference scores were created to establish whether parents agreed on setting time limits at each time point, and repeated-measures ANOVAs were run to investigate whether setting time limits influenced screen usage.

Additionally, exploratory analyses, including ANOVAs and correlations, were run with parents' childcare hours to investigate whether individual differences in parents' reasons for and/or rules around screen usage and children's screen time were partially explained by how much time parents spent caring for their children.

Results

4.9. Screen usage

Most children were engaging in screen time at all three time points, and screen time increased as children got older. Figure 4.1 shows the distribution of children's screen time across all three time points. Notably, by the third time point (age 36-months), all children were engaging in screen time for at least 30 minutes a day, on average. Individual differences were stable across timepoints, T1-T2: $r(151) = .587$, $p < .001$; T2-T3: $r(123) = .597$, $p < .001$; T1-T3: $r(105) = .542$, $p < .001$. Mean screen usage times were: $M_{T1} = 47.49$, $SD = 43.38$, $M_{T2} = 84.48$, $SD = 61.94$, $M_{T3} = 115.86$, $SD = 53.60$. There were no gender differences in screen use at any timepoint, ts $\leq .656$, ps $\geq .513$.

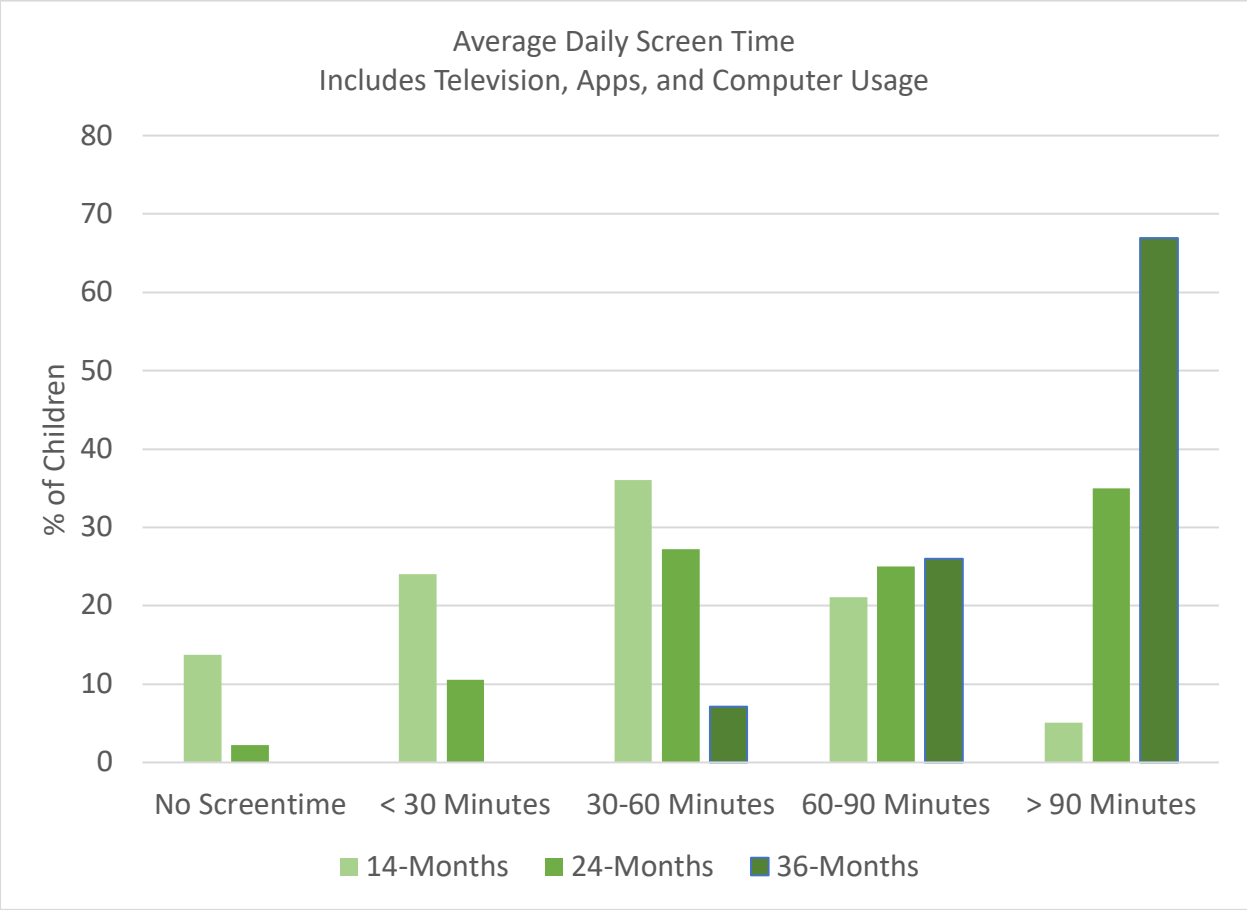


Figure 4.1. Screen usage increased with child age.

Detailed interviews at T2 revealed a high prevalence of technology in homes. 94% of mothers reported having a television in the home, 87% had at least one tablet in the family, 99% had at least one smartphone in the household, 36% had a desktop computer at home, and 92% had a laptop computer. Parents mentioned several other devices, such as e-readers (11% of mothers, 19% of fathers), google home (1% of mothers) and Alexa (3% of mothers, 1% of fathers), and games systems (15% of mothers, 15% of fathers) during interviews. Percentage differences here are related to the number of parents who answered these questions, but also may be due to some parents not reporting technology that was not specifically mentioned in the interview question.

4.10. Context of screen usage – 24-month technology interview results

Parent reports for which devices children used were very similar, and thus reports were combined. Most (84%) of children watch television programmes on a television. A large amount of television programmes were also being viewed on tablets (46% of children watched on a tablet), and some television programmes were being watched on smart phones (22% of children watched on a smart phone). A small number of children watched programmes on computers (2% watched on a desktop, and 5% watched on a laptop).

Figure 4.2 shows when in the day children were watching television at T2. Though reports were similar for mothers and fathers, some slight differences emerged, perhaps due to when parents are with their children, so data are reported separately. It may be that parents who spend less time with their children know about how much time their children spend watching television during the day (perhaps due to conversations with their partners), but are less aware of the specificity in the daily routine. Most television watching happened in the mornings (44% of mothers and 37% of fathers reported morning television time for their children) and evenings (42% of mothers and 41% of fathers said their children watched TV in the evenings). Of note, 14% of mothers and 12% of fathers reported that their child watched television whilst eating at least one meal during the day. Children were watching television at other times throughout the day, as well. The average bout of television was around 36 minutes (mothers' report: 35.99 minutes, range 5 minutes to 240 minutes; fathers' report: 36.75 minutes range 5 minutes to 140 minutes).

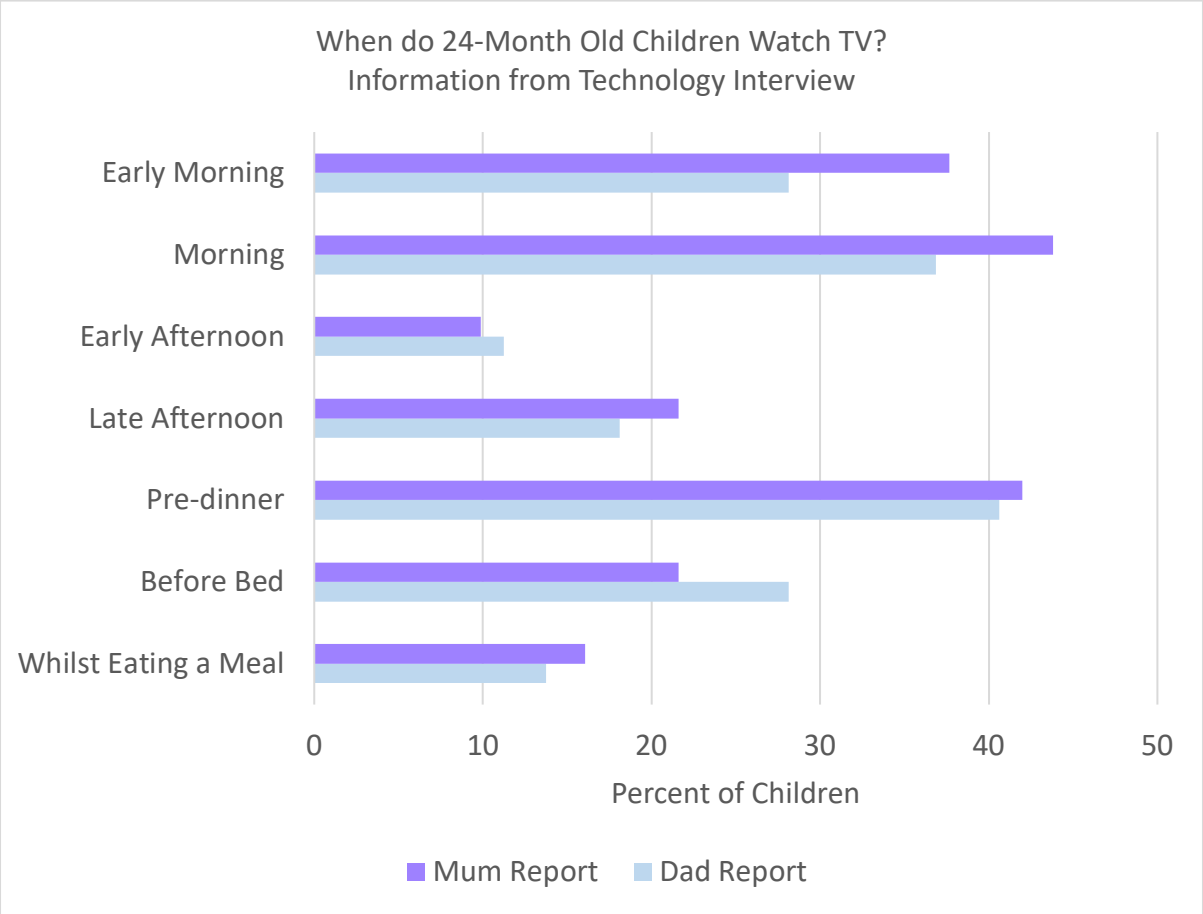


Figure 4.2. Children watch television at various times throughout the day.
Note: children may watch at different times a day. Parents were able to name up to 3 times children watched in a given day (which could be three separate meal times, which are binned together here). According to mothers, 41 children only watch at one time/day, 89 children watch at two times/day, and 32 children watch at 3 times/day. According to fathers, 56 children watch at 1 time/day, 75 children watch at 2 times/day, and 29 children watch at 3 times/day.

For applications and games, 54% of mothers and 60% of fathers reported that their child used applications and games. Parents' reports did not reveal consistent patterns with regard to what time of day children typically played. Therefore, parents' responses to interview questions were coded into general use patterns, results of which can be seen in Table 4.1.

Table 4.1. When children use touch screens.

Usage	Percentage of Children (of children who use touchscreens) (Mother Report, N=79)	Percentage of Children (of children who use touchscreens) (Father Report, N=74)
Used interchangeably with TV for screen time	19%	31%
Used in transit	53%	28%
Used when child is upset	5%	5%
Used when child asks for it	42%	45%
Used when child is ill	1%	0%
Percentage of children with reports who do not use touchscreens	53.8%	51.9

Note: Some children use apps at more than one time

During the technology interview at the 24-month visit, parents' activities during their children's television viewing when they were home were recorded and then categorised into three possible activities: sitting with the child watching television together, in the same room as the child, but doing something besides engaging in the same screen content, or out of the room. Parents reported on their activities for all typical viewing times, and so could engage in more than one activity during children's screen time (see Figure 4.3).

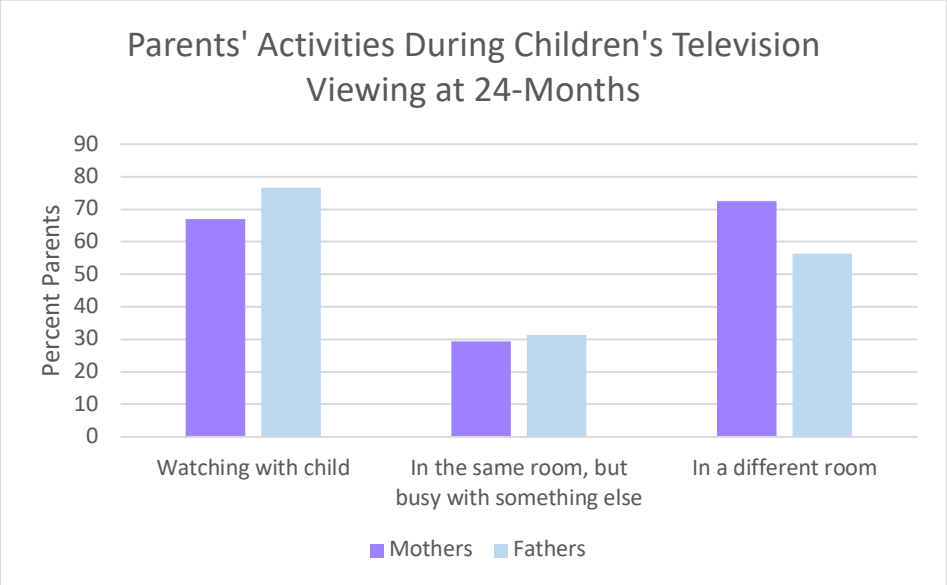


Figure 4.3. Parents engaged in a variety of activities whilst their children were watching television at 24-months. Note, parents may have reported doing more than one activity during typical television viewing.

To establish viewing contexts by child, a variable was created for viewing with a parent, and children were put into one of four categories. 11% of children watched with neither parent, 13% of children watched only with their mothers, 21% of children watched only with their fathers, and for 55% of children, both parents reported watching with their children. These percentages were similar for boys and girls, *Cramer's V* = .081, $p = .800$.

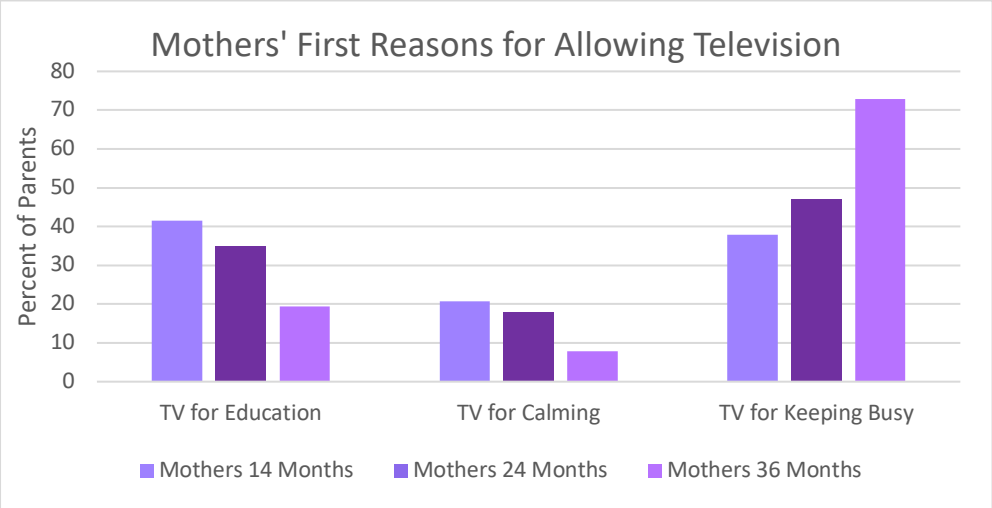
Most children use video chatting – 87% of mothers and 89% of fathers reported that children communicated via video chat. Due to high agreement, mothers' and fathers' reports were combined to establish whom children chatted with. Most children (73%) used video chatting to talk to grandparents and 50% of children chatted with other family members. 24% of children used video chat to talk with their parents and 9% chatted with friends/family friends.

4.11. Parental attitudes and intentions

4.11.1. Reasons for allowing television at each time-point. When ranking the reasons children were allowed to watch television at T1, educating their children was the first choice for both mothers (42%) and fathers (45%). Note however that keeping their children busy was not far behind as a first choice for mothers (38%; for fathers, 30%). At T2, Mothers (47%) and fathers (47%) chose keeping their children busy as their first choice; though, for fathers, education (42%) was also a popular choice. At T3, parents overwhelmingly ranked keeping their children busy as their first reason for allowing television time, with 73% of mothers and 57% of fathers indicating this choice (see Figure 4.4 for full descriptive data). Chi-squared goodness of fit tests revealed that all ranking distributions were significantly different from chance, $\chi^2 \geq 9.96$, $p \leq .002$ (see Table 4.2).

Table 4.2. Results of χ^2 goodness of fit tests for parental reasons for allowing TV – the variety of parents' reasons were significantly different from chance.

	Mothers' Reasons for TV	Fathers' Reasons for TV
14-Months	$\chi^2 = 12.05$	$\chi^2 = 9.96$
	$P = .002$	$P < .001$
24-Months	$\chi^2 = 21.99$	$\chi^2 = 39.76$
	$P < .001$	$P < .001$
36-Months	$\chi^2 = 93.35$	$\chi^2 = 30.36$
	$P < .001$	$P < .001$



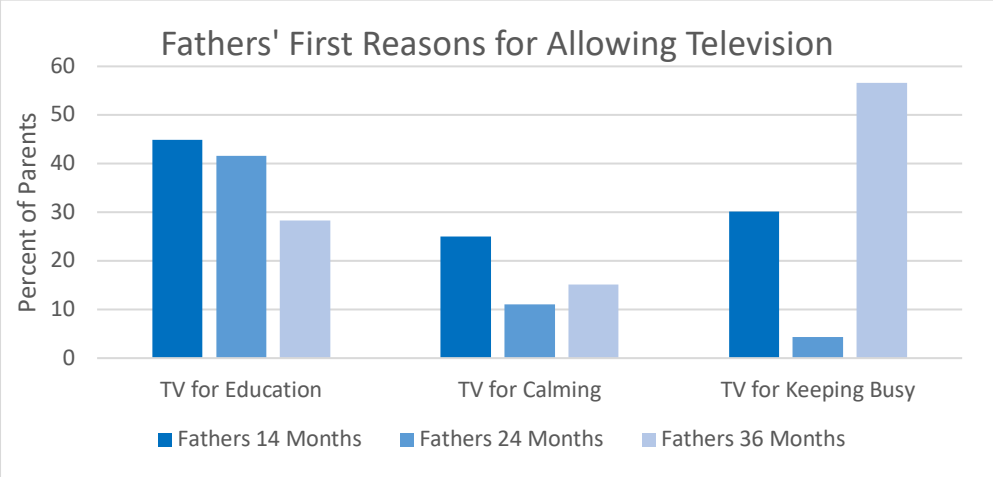


Figure 4.4. Parents' reasons for allowing screen usage changed over time.

4.11.2. Child gender. Parent reasons for allowing television did not differ based on whether they had sons or daughters. Chi-squared tests were non-significant for parents' first choice reasons for allowing their children to watch television by gender, χ^2s $\leq$ 2.23, *p*s $\geq$ .329.

4.11.3. Changes over time. McNemar tests revealed some significant changes in parents' reasons for allowing television watching over time. The number of mothers who chose education as their first choice significantly decreased from T1 to T3, $p < .001$, and from T2 to T3, $p = .008$. Fathers were less likely to rank education as their first choice at T3 than at T1, $p = .014$. Mothers' choices to score keeping their children busy as their first choice for television viewing significantly increased from T1 to T2, $p = .040$, from T1 to T3, $p < .001$, and from T2 to T3, $p = .001$. Similarly, fathers chose keeping their children busy as their first choice more often at T2 than T1, $p < .001$, and at T3 than T2, $p < .001$. Mothers were more likely to rank calming their children as their first choice at T1 than T3, $p = .006$, and fathers were more likely to rank calming as their first choice at T1 than T2, $p = .001$.

4.11.4. Differences between mothers and fathers. There were also some significant differences in choices between parents. McNemar tests revealed that, at 24M, fathers were marginally more likely to rank education as their first choice than were mothers, $p = .056$. At T3, fathers were more likely to rank education as their first choice than mothers, $p = .017$, and mothers were more likely to rank keeping their children busy as their first choice than fathers, $p = .001$.

4.11.5. Differences by child's screen usage. Children were divided into low or high screen use at each time point using a median split at each time point (38 minutes at 14-Months, 75 minutes at 24-months, and 105 minutes at 36-monts) and chi-squared tests were run to establish whether there were differences in parents' reasons for television

based on screen time. There were no statistically significant differences in parent reasons based on whether children watched more or less screen time, $\chi^2 \leq 3.697$, $p \geq .157$.

4.11.6. Attitudes about specific programmes. In addition to ranking their general reasons for allowing television watching, during the interview at T2, parents were asked to say why they liked their children's favourite television programmes. Parents named a number of reasons, which are summarised in Figure 4.5. Because parents are primarily responsible for children's television choices during toddlerhood, parents' answers to this question were conceptualised as parental attitudes. Despite choosing keeping their children busy as their first reason for allowing screen time, education is the most popular reason for liking their children's favourite programme; 32% of mothers and 33% fathers mentioned education or educational qualities when talking about what they liked about their children's favourite programmes. The entertainment value of programmes, both that for children and for parents, were popular responses, as well; 15% of mothers and 16% of fathers mentioned that their child's favourite programme was entertaining for their child; 12% of mothers and 20% of fathers mentioned that their child's favourite programme was also entertaining to them.

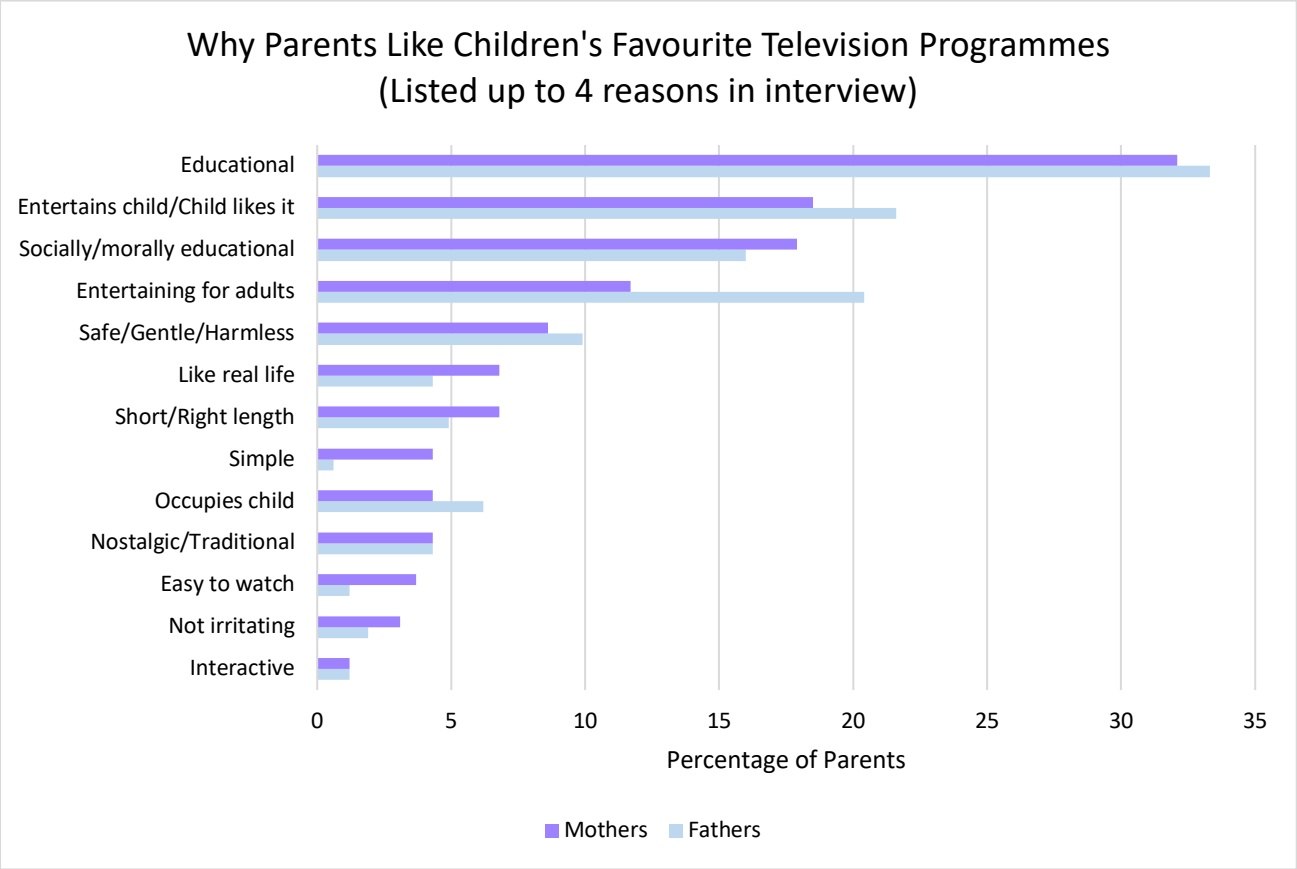
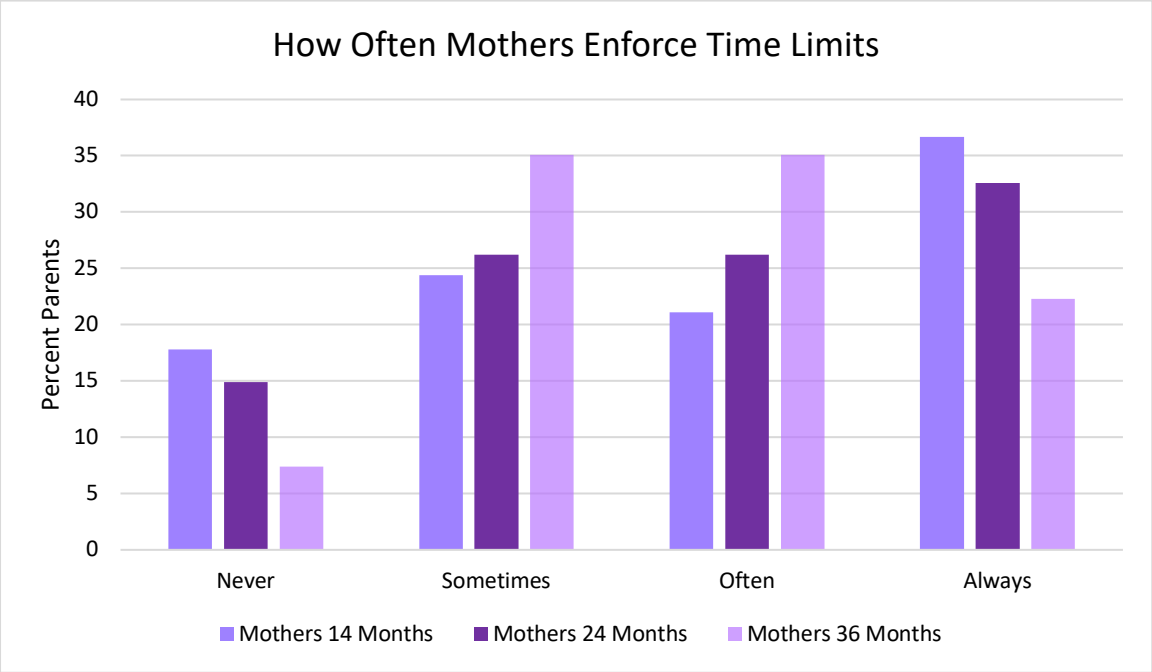


Figure 4.5. Parents' self-reported attitudes towards television programmes – parents like their children's favourite programmes for a variety of reasons, but mostly for educational purposes.

4.11.7. Time limits for screen use. Questionnaires at each time point indicated that time limits for screen usage were mostly enforced, for parents who found the question about time limits applicable (see Table 4.3). Between 82% and 93% of mothers and between 75% and 92% of fathers indicated that time limits are enforced at least sometimes at each time point (see Figure 4.6 for more detail).

Table 4.3. Percent of parents who found questions about screen time limits applicable.

14-Months		24-Months		36-Months	
Mothers	Fathers	Mothers	Fathers	Mothers	Fathers
55%	57%	82%	84%	97%	84%



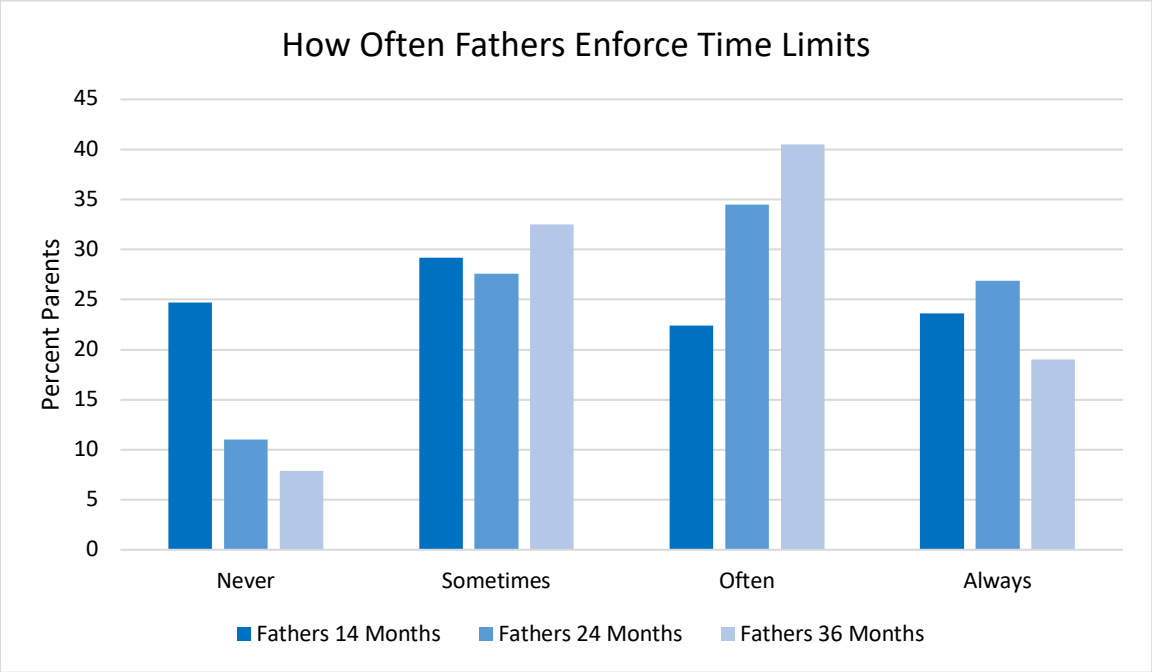
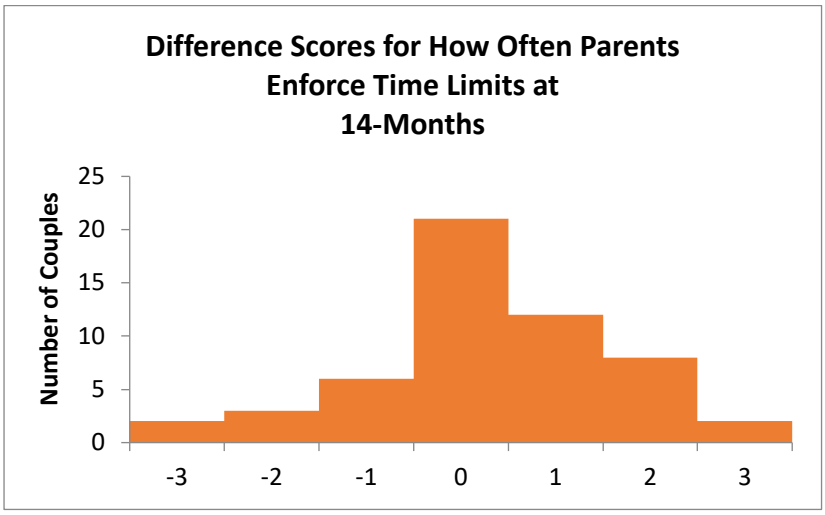


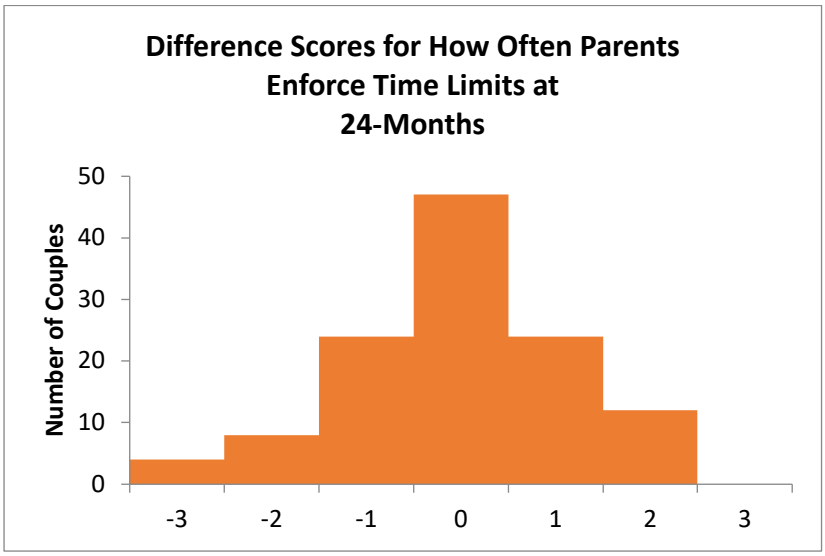
Figure 4.6. How often screen time limits are enforced – most parents enforce rules at least sometimes.

Difference scores were calculated to identify whether mothers and fathers agreed on how often time limits were enforced around screen time. Scores were converted to numbers such that 1 = never and 4 = always. For the most part, there was good agreement, for difference scores ($M_{14\text{-}months}$ = .30, $SD_{14\text{-}months}$ = 1.33; $M_{24\text{-}months}$ = =.03, $SD_{24\text{-}months}$ = 1.18; $M_{36\text{-}months}$ = .04, $SD_{36\text{-}months}$ = .94). Figure 4.7 illustrates the distributions of difference scores at each time-point.

Contingency scores were established to see if parents' rules changed over time. For mothers, rule enforcement was consistent from 14- to 24-months, *Cramer's V* = .36, *p* = .001, and from 24- to 36-months, *Cramer's V* = .30, *p* < .001. For fathers, rule enforcement was consistent, but less so from 14- to 24-months, *Cramer's V* = .27, *p* = .040. However, fathers were not consistent in time limit enforcement from 24- to 36-months, *Cramer's V* = .21, *p* = .186. Contingency tables revealed that 27 fathers enforced time limits more often when children were 36-months old and 37 enforced time limits less often.

4.11.8. Rules and screen time quantity. To investigate whether screen time limits were related to quantity of screen time concurrently and over time, repeated-measures ANOVAs were run with 14-, 24, and 36-month screen time as the dependent variables and parents' enforcement of time limits as the independent variable. Considering mothers' time limits at 14-months, there were main effects of time, $F(2, 47) = 31.64$, $p < .001$, $\eta_p^2 = .402$, and time limit enforcement, $F(3, 47) = 4.73$, $p = .006$, $\eta_p^2 = .232$ (see Figure 4.8), but there was no significant interaction effect. For fathers' enforcement, there was only a main effect of time such that screen time increased with time, $F(2, 49) = 31.47$, $p < .001$, $\eta_p^2 = .391$, and there was no significant interaction effect (see Figure 4.9).





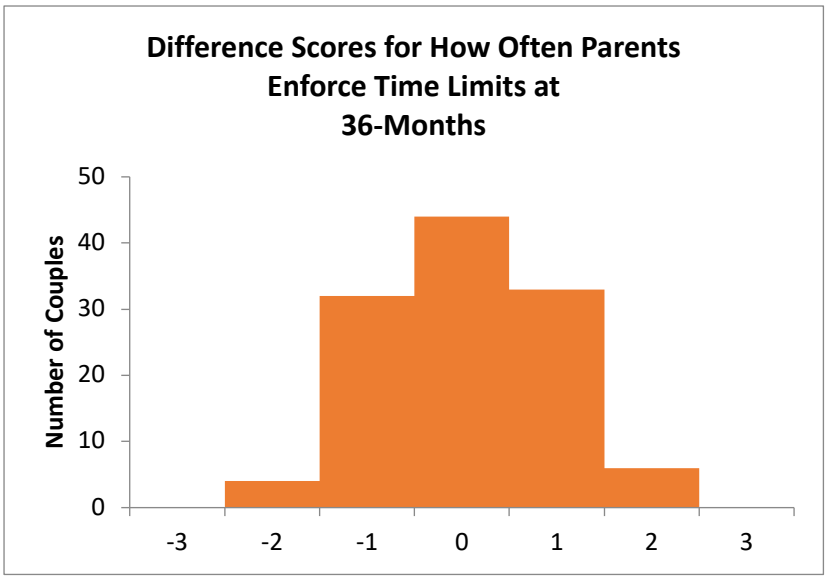


Figure 4.7. Parents mostly agreed on how often they enforced time limits; very few disagreed with each other strongly

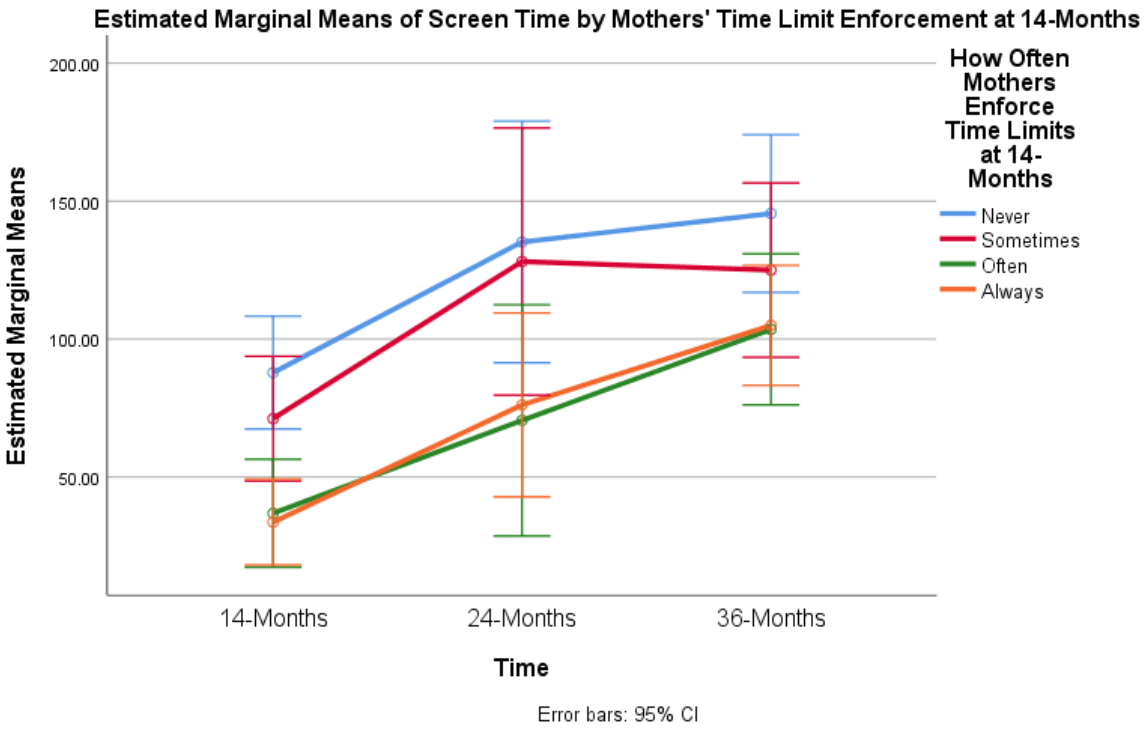


Figure 4.8. Screen time increased with age and mothers who were more restrictive at 14-months had children who engaged with less screen time at each concurrent and subsequent time-point.

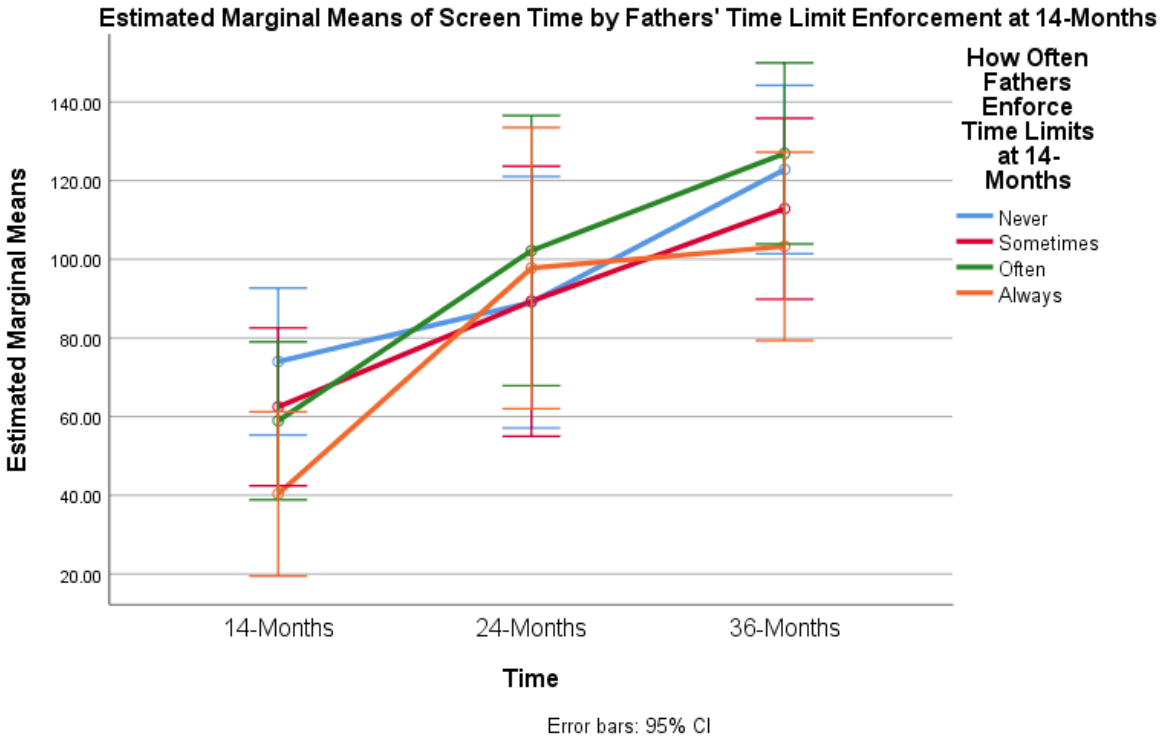


Figure 4.9. Screen time increased with age, and there was no main effect or interaction effect with time of fathers' rule enforcement at 14-months on screen time.

Next, rules at 24-months were included as the independent variable, screen time at 24-months and 36-months were included as dependent variables. For mothers' rule enforcement, there were main effects of time, $F(1, 93) = 17.96$, $p < .001$, $\eta_p^2 = .162$, and rule enforcement, $F(3, 93) = 4.09$, $p = .009$, $\eta_p^2 = .116$, and an interaction between time and rule enforcement, $F(3, 93) = 2.86$, $p = .041$, $\eta_p^2 = .084$ (see Figure 4.10). For fathers, there were main effects of time, $F(1, 93) = 28.42$, $p < .001$, $\eta_p^2 = .234$, and rule enforcement, $F(3, 93) = 4.23$, $p = .008$, $\eta_p^2 = .120$ (see Figure 4.11), and no significant interaction effect.

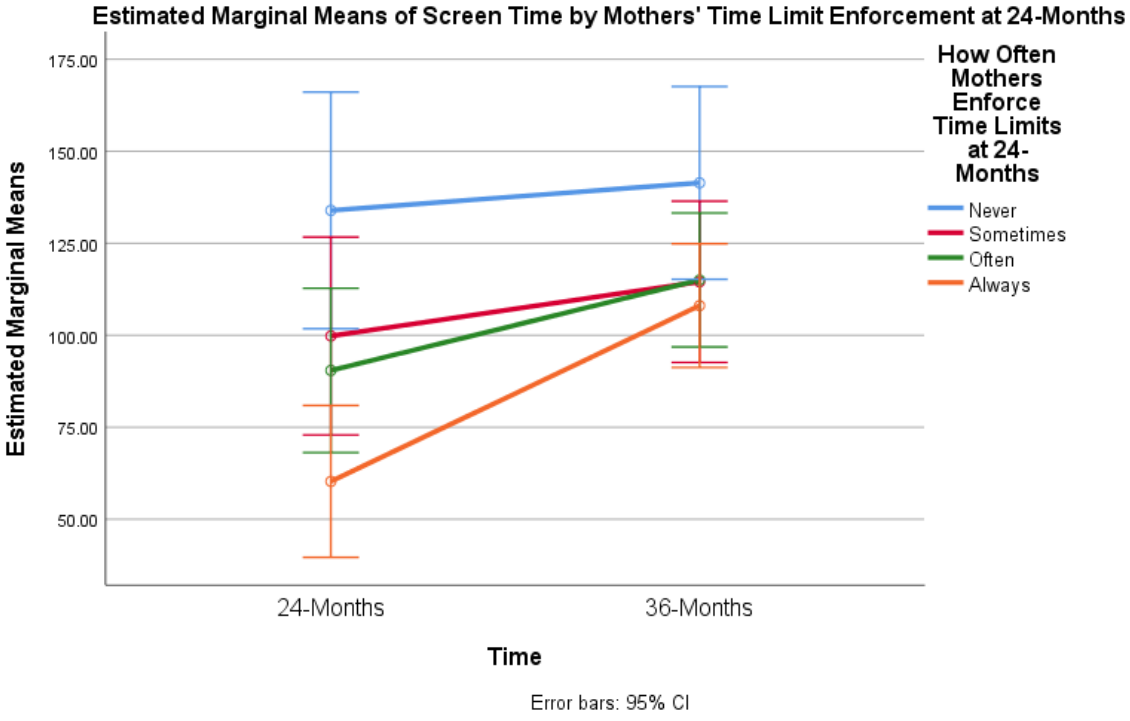


Figure 4.10. Screen time increased from 24- to 36-months, but more so for children of mothers who always enforced time limits at 24-months than for children of mothers who enforced time limits less frequently.

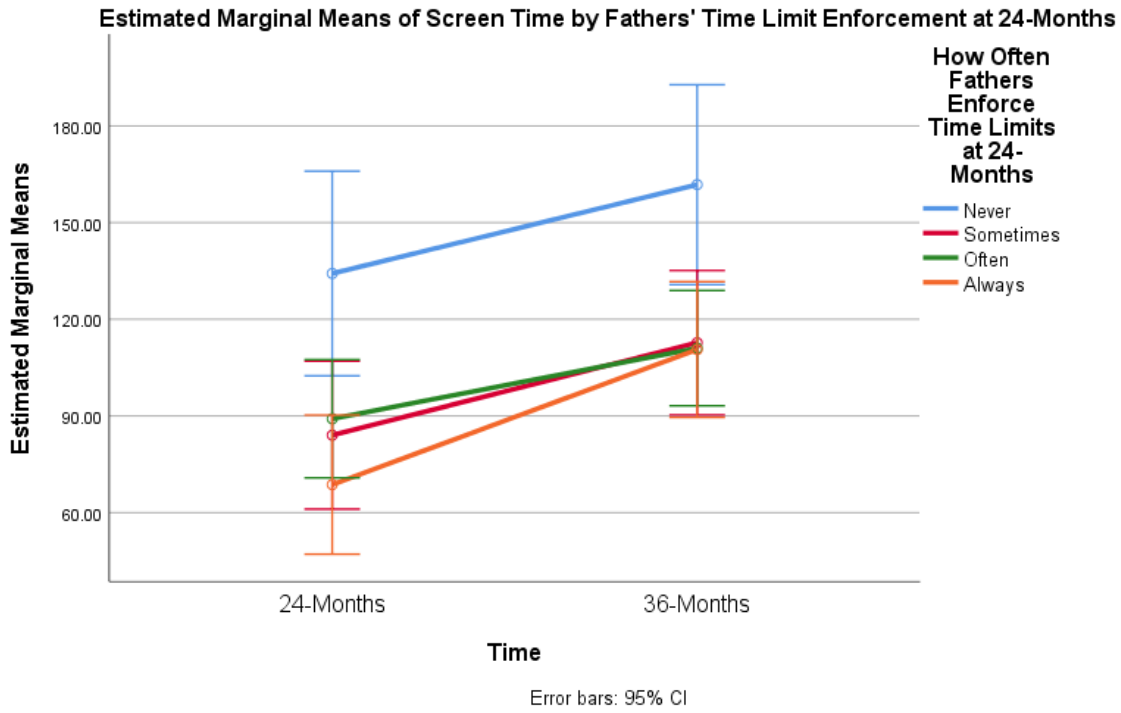


Figure 4.11. Screen time increased from 24- to 36-months and fathers who were more restrictive at 24-months had children who watched less screen time at both time-points.

One-way ANOVAs were carried out to investigate whether how often parents enforced rules was related to children's concurrent quantity of screen time at 36-months. There were no differences based on mothers' reported time limits, $F(3, 119) = 1.65$, $p = .183$, or fathers' reported time limits, $F(3, 117) = 1.78$, $p = .156$.

4.11.9. Specificity of rules. Interview data revealed that, even if they did not say outright that they had rules, 88% of mothers and 87% of fathers indicated that, when their children were 24-months old, there were some rules around technology use for their children. Of the 158 mothers who indicated they had rules, 68 of them (43%) had rules that were vague, such as "not too much" or "we try to limit screen time." 37 mothers (23%) enforced time limits, 21 (13%) enforced limits on the number of episodes children watched at a time or in a day, and 6 (4%) spoke about specific content rules. In addition, 40 (25%) mentioned specific rules, such as "no tablet use," "no TV on weekends," or "TV only during

meal times." Note, some parents had rules that fit multiple categories. Similarly, 160 fathers elaborated on rules (despite only 156 reporting they had rules when asked in the interview), and 79 (49%) of these elaborations were vague. 33 (21%) fathers enforced time limits, 16 (10%) enforced limits on the number of episodes children could watch at one time or in a day, and 8 (5%) mentioned specific content rules. 48 (30%) of fathers mentioned specific rules.

4.12. Parents' childcare hours and screen time

Exploratory analyses to investigate whether parents' childcare hours were related to screen time, intentions, or rules at 14-months (M_{Mother} = .61, SD_{Mother} = .22; M_{Father} = .38, SD_{Father} = .20) and 24-months (M_{Mother} = .57, SD_{Mother} = .21; M_{Father} = .33, SD_{Father} = .14) were run; information on childcare hours was not collected at 36-months. Analyses were run concurrently only, as childcare hours may help explain trends in the data – children who spend more time with their parents (rather than at nursery or with a childminder) may watch more screens and parents who spend more time with their children may utilise screens more often or have rules around screen time that their partners are unaware of. There were no significant correlations between the proportion of childcare hours for either parent and screen time concurrently, $|r|$s $\leq .131$, ps $\geq .113$.

One-way ANOVAs with proportion of childcare hours as the dependent variable and parent first reason for allowing television as the grouping variable (both with the same parent's childcare hours and reasons, and different parent's childcare hours and reasons) at 14- and 24-months as the grouping variable revealed no significant main effects, Fs ≤ 2.58, ps $\geq .080$.

Pearson correlations were run to investigate associations between parents' childcare hours and how much parents disagreed about the enforcement of screen time rules. The

difference scores described above were calculated such that fathers' enforcement was subtracted from mothers' reports. An absolute value was taken such that a higher number reflected more disagreement, but did not reflect which parent enforced rules more often. There was only one significant association between the proportion of childcare and difference scores. Mothers' childcare time was positively significantly correlated with difference scores at 14-months, $r(52) = .275$, $p = .044$, such that mothers who spent more time with their children disagreed with their partners about rules more often. The distribution of difference scores (see Figure 4.7) illustrates that more disagreement is on the positive end of the distribution, indicating that mothers enforce rules more than fathers do when their children are 14-months old.

Discussion

According to their parents, the children in the NewFAMS engaged in screen time from at least as early as 14-months of age; the quantity of screen time increased as children got older, and individual differences around screen use were stable over time. There was variation in how much parents engaged in screen time with their children when they were 24-months old, but on the whole, most parents were at least sometimes co-engaging and many parents were sometimes allowing screens to occupy their children. Parents' reasons for allowing television time changed as children got older. When children were 14-months of age, most parents allowed screen time assuming there was an educational advantage to doing so; by 36-months of age, children were allowed screen time most often in order to keep them busy. Parental reasons for why children should use screens were, for the most part, very similar, and mothers and fathers were most often enforcing rules the same amount within couples.

4.13. General screen usage

The high prevalence of screen time at each time point in the current study was in line with prior research (e.g., Barr & Linebarger, 2017; Broadcasters' Audience Research Board, 2016); the increase in overall screen time between 14- and 36-months of age was expected. Indeed, in a diverse sample in the UK, Barber et al. (2017) found that 75% of children were engaging at screen time at 12-months of age, and that at subsequent time points (18-, 24-, and 36-months of age), average television use increased each time. This increase in screen use across time is important for content creators to consider. As discussed in Chapter 3, most programmes children were watching were not created for them at 24-months, and so more content should be created for toddlers of this age. The increase here, however, suggests that there should be programming for children of all ages, but perhaps more content should be available for each increasing age group. The increase in viewing across time is also important to consider when investigating the effects of screen time on various developmental outcomes. It could be that screen time at different time points affects critical development in unique ways, and viewing more over time could affect these outcomes in important ways. For example, prosocial development is critical in the second and third years of life (Brownell, 2016) and it could be that children who engage with screens less at 24-months than other children are at an advantage. However, for something like sleep, it could be that if children are engaging with screens more often as they get older, their sleep is differentially affected at each age, which may then in turn affect various outcomes.

Variation between families, with some allowing no screen time at T1 and T2 and others allowing children to engage in more than an hour a day, suggests that some parents may have considered current guidelines that recommend creating a media plan, taking the

individual child into account (American Academy of Pediatrics, 2016). However, this variation may just reflect natural variation without the influence of guidelines. Notably, this variance was not related to how much time children spent with either parent at any time point. Therefore, this natural variation does not seem to be related to some children spending more time at home than others. Further, variation in screen time was stable across time points, which was in line with previous research that found consistency in screen use over time- daily screen time at one-year old has predicted daily screen time at two-, three-and-a-half-, and five-years old (Xu et al., 2016). This stability suggests that parents are making choices about allowing screen time based on underlying attitudes, in line with Hamilton et al. (2016)'s theoretical understanding of parents' intentions to restrict screen time based on their attitudes towards screen use. There is, however, an increase in screen use overall, which may reflect changes in attitude as children get older, or may reflect age-related aspects of parents' attitudes and intentions. For example, parents who are keen to educate their children with screen time may recognise that this will be better accomplished with screen use when in older toddlerhood than when children are 14-months old.

Parents' concordance in reports of screen time suggests the quantity of screen time is a deliberate choice for families, perhaps in line with the newer guidelines that involve discussing screen use in the home (AAP, 2016). It could also be that screen use occurs naturalistically and both parents are accurate in reporting screen use in the home. It does not appear to be the case that some parents are allowing screen time without their partner's awareness, especially since parents agreed overall on how often they enforced rules at each time-point. However, many parents were only able to describe their rules in vague terms, saying things like "he can't watch too much" or "we know when she's had

enough." This implies that though there may have been underlying beliefs about screen time and general ideas around not wanting too much of it, temporal attitudes around screen use that translated into action may have been dependent on the situation.

4.14. Context of screen use

Children's screen usage at age 24-months occurred throughout the day, but was concentrated in the mornings and evenings. Children watched television for about 36 minutes at a time. These findings are novel, and they begin to really elucidate how, specifically, children engage in screen time. In addition, parents' activities varied during child screen use, with many parents using screen time as shared family activities, and many using screen time to accomplish household chores or take some time for themselves. The fact that so many parents were essentially using television as a babysitter was unexpectedly high, considering Hnatiuk et al. (2015) found that only just under half of parents left their children watching television. This may have been due to the older age of our sample (14- to 36-months rather than four- to 19-months); as children get older they may need more entertainment and parents may need additional ways to keep them still and out of trouble when doing chores such as cooking. In addition, mothers reported leaving the room when their children were viewing more than fathers did. This may be due to the fact that mothers were spending more time with their children at 24-months and so needed to get other things taken care of, such as preparing children's meals, more often than fathers, who may have been able to come home from work and enjoy family screen time.

4.15. Parents' attitudes toward screen use

4.15.1. Parent reasons and intentions over time. When parents were asked to rank why they allowed their children to engage in screen time, they suggested that they wanted their 14-month old children to learn from television. At T2, when parents were asked to talk

about what they liked about their children's favourite television programmes, they overwhelmingly gave answers about education and education goals such as language learning. Fathers are particularly keen for their children to learn from screens as they get older, even as mothers have turned their attention to using television to keep children busy. However, this educational goal is difficult to accomplish because screen content and educational goals in programmes like *Sesame Street* are aimed at higher-aged audiences than 24-month old children (Common Sense Media, 2017). For example, CBeebies claims to be for children ages zero to six (BBC, 2017), but claims, "at the youngest end children may be happy to passively view television" (BBC, 2017). Disconnect between network goals and parents' reasons for using television indicates that television content must be available for very young children to truly engage with and learn from.

The use of television to calm children down was infrequent and decreased over time. In contrast, at each time point, and increasingly as time went on, television was used to keep children busy, especially for mothers, highlighting that television must keep children's attention and that television may be an independent activity that can be an important socialising tool. This trend in increased use of screens to keep children busy was independent of how much screen time children engaged in – it was not the case that children who had higher screen time also were more likely to have parents who used screens to keep their children busy. This suggests that parents are interested in using screens to keep children busy as they get older, even if it is just for a short time to accomplish something. This is important because if parents are utilising screens as a babysitter, children are likely watching with their parents less often; parental scaffolding can help decrease the transfer deficit (e.g., Zack & Bar, 2016), such that children who are

watching screens to keep them occupied are likely getting fewer benefits from screen time than children who watch with their parents.

Importantly, parents' reasons for allowing television were not related to the number of hours children spent with parents (as opposed to outside childcare), suggesting that attitudes are reflective of overall feelings around screen time rather than simply out of a need for something to do when spending all day with children at home. Further understanding parents' motives for using screens will enlighten researchers and content creators about how screens are being used as a tool and how they can be optimised as a tool for socialisation. Indeed, understanding the context, which may be related to motives, especially when screens are being used to keep children busy, will help creators understand how much they should use participatory structures and how much to target their content to audiences who need to understand without adult coaching.

Importantly, parents only reported what their children were watching at T2; therefore, it is unclear whether parents are reporting on the same television programmes at each time point. It could be that parents initially use programmes for education, but, as children become more familiar with the content, parents utilise television for entertainment and/or to keep their children busy. There could also be an increase in children's attention to television as they get older (e.g., Anderson & Subrahmanyam, 2017; Hipp et al., 2017), which might make television an easier distraction for two- and three-year-old children than it is for 14-month-old children. In addition, parents might use technology for more than one reason, and these data only report on their top choice. Future research should investigate how often children are allowed screen time for each reason, and should perhaps expand the options. There may also be differences by content such that children may engage with some

screen content primarily for education and engage with other content for entertainment or as a calming mechanism.

4.15.2. Child gender. Child gender was unrelated to parent reasons for television time – this was true for television and interactive screen use, for both parents, and at all time points. These findings suggest that there are not gender-based child behaviours or parent opinions that are affecting why parents choose to allow screen time. Indeed, it does not appear to be the case that boys need to be calmed down or girls need to be kept busy by using screens in toddlerhood. Taken together with the lack of gender differences discussed in Chapter 3 and the fact that boys and girls are not engaging with significantly different amounts of screen time, these findings suggest that parents are not highly concerned with gendered messages or content when their children are toddlers and that boys and girls, by and large, have the same screen time experiences in toddlerhood.

4.15.3. Screen time rules. When it comes to rules around screen usage, most parents indicated some enforcement of rules, however many of the rules outwardly described at T2 were very vague. Some parents enforced time limits at each time-point, and, for the most part, parents agreed on how often time limits were enforced. The extent to which parents disagreed at 14-months was related to the proportion of time mothers spent caring for their children concurrently such that mothers who spent more time with their children disagreed with their partners more. In addition, when their children were 14-months old, mothers enforced rules more often than fathers. This association suggests that when mothers are home with their children for more of the day or for more days a week, parents may have different rules for their time together, or fathers may be more unaware of what mothers' rules are during the day. Importantly, this trend is not repeated at 24-months, suggesting that parents are communicating better with each other about screen

time regardless of who is spending more time with their children. The mean proportion of time mothers spend with their children declines from T1 to T2, but only slightly, so this change in pattern is not likely explained by more children being in nursery or spending less time being cared for by their mothers.

The frequency of enforcing time limits, especially when placed by mothers, was related both concurrently and longitudinally to children's screen time. Screen time did increase with time regardless of rule enforcement, and children whose mothers and fathers enforced time limits more often at 24-months engaged with less screen time at 24- and 36-months. Mothers' limits at 24-months also interacted with time such that limits at 24-months resulted in less increase in screen time from 24-months to 36-months. Only mothers' limits at 14-months had an effect on screen time, and parents' limits were not associated with screen time at 36-months. These results all suggest that time limits, especially in early toddlerhood, are working to decrease screen time both when the limits are being set and longitudinally; essentially, the limits are working. These findings suggest that at least some parents are following guidelines to limit screen time. The finding that children who had children who enforced limits more often are in line with Hnatiuk et al. (2015), who found that parents with high self-efficacy in enforcing television rules watched less television. The fact that rules are working is important for policy-creators who can point to the efficacy of creating good limits, even in the face of an ever-more technological society.

Crucially, the question here was simply whether or not time limits were enforced and how often, not what the time limits were. Parents' agreement identifies that couples agree that limits should be set, but it remains unclear whether they agree on what those limits should be. Overall, the habit of enforcing a time limit is related to less screen time,

which suggests that conscious limits are key. Parents and caregivers decide how toddlers spend all of their time, so in practice, all parents limit screen time. However, parents who actively limit screen time have children who watch less screen time longitudinally and concurrently, suggesting that more active screen time limits play an important role in children's engagement with screens across early life. Active limits may be related to specific guidelines, which could explain the lower quantities of screen time for toddlers with active limits. Alternatively, parents who think about limiting screen time are concerned about its effects and therefore limit it to less than what parents with less active limits find appropriate in the course of deciding how to spend any given day. These early screen time limits may influence the way children engage with screens as they continue to grow.

Conclusions

In conclusion, children in the current sample were engaging with more screen time than experts recommend from as early as 14-months old. Screen time increased with age, and individual differences in amount of screen time were stable. Many children watched at least some television with their parents, but children were also often left alone to watch. Parents' reasons for and intentions around screen time and content fluctuated a bit as children got older – whereas parents were very keen to use screens to help educate their children at 14-months, as they got older priorities changed to using screens to keep children busy with screens. These reasons did not differ by child gender, but mothers and fathers were interested in different things. Most parents did have rules about screen usage, but many of these rules were vague and did not relate to amount of screen time. Couples did agree on how often time limits were set, and these rules did seem to work to reduce screen time longitudinally. Whether the quantity of screen time children engage in has any implications for social behaviour will be discussed in Chapter 5.

Chapter 5. Does screen time help or hinder the development of prosocial behaviour and does content or format matter

Parents and researchers alike have, for many years, been asking whether television and other screen time (e.g., playing games) is detrimental, beneficial, or simply has a neutral impact on children's behaviour. Indeed, after reviewing the limited literature available at the time, Schramm, Lyle, and Parker concluded in 1961 that, "for *some* children, under *some* conditions, *some* television is harmful. For *other* children under the same conditions, or for the same children under *other* conditions, it may be beneficial. For *most* children, under *most* conditions, *most* television is probably neither particularly harmful nor particularly beneficial" (p 1, emphasis original). Since this claim, television has become more prevalent and the appropriate content available to children has become more varied. It is neither clear whether television, on the whole, is harmful to toddlers, nor whether television can be beneficial for toddlers. The current chapter aims to add some information to this debate by examining whether screen time on its own, that is, the amount of time or the quantity of screen time, is detrimental to prosocial behaviour and whether prosocial content moderates this association. In addition, the current chapter investigates whether prosocial television programs could be beneficial for prosocial behaviour, or whether the transfer deficit seen in research on other areas of development is present for social behaviour. Finally, the current chapter investigates whether content and format features (specifically conversational techniques and pacing of programmes) of children's television and films influence the association between prosocial screen time and prosocial outcomes.

5.1. Technology and prosocial behaviour

5.1.1. Screen time as a socialising distractor. Screen time has become a ubiquitous part of childhood, and life in general, and, as described in Chapter 4, was very popular in the current sample (see Figure 4.1, p 131 – screen time was popular for children at all three time points and increased with age). In addition, it is well established that toddlerhood is critical for prosocial development, and socialisation from parents and caregivers is important for its development (e.g., Brownell, 2016). This socialisation may include modelling, scaffolding, instruction, reinforcement, behavioural control, and/or other-oriented reasoning, as discussed in section 1.2 of the introductory chapter.

Screen time and the socialisation of prosocial behaviour may be associated in interesting ways. Screen time might take children away from other socialising activities, for example important socialisation from caretakers and time spent engaging in social activities. Screen time and background television, even when the background television was infant-directed, has been found to inhibit child play and interactions (Courage, Murphy, Goulding, & Setliff, 2010; Kirkorian, Pempek, Murphy, Schmidt, & Anderson, 2009; Schmidt, Pempek, Kirkorian, Lund, & Anderson, 2008). For example, Courage et al. (2010) found that 48 six-month-old infants spent more time looking at toys when the television was off, than when it was on ($t(47) = 7.87$, $p < .001$). In addition, Pempek et al. (2014) found that parents of 12-, 24-, and 36-month-old children spoke significantly less when the television was on than when it was off ($\eta_p^2 = .522$) These disruptions to play and interactions with parents may hinder socialisation of prosocial skills. These studies highlight important negative impacts of increased screen time during infancy and toddlerhood. However, all of these studies were conducted in the lab and observed interactions whilst parents and children viewed programmes that researchers chose to show instead of programmes children view regularly.

Furthermore, these studies did not examine the impact of screen tie on more sophisticated social behavioural outcomes in children. In addressing these shortcomings, the current study investigates whether increased screen time watching programmes and films children choose to watch has negative impacts on social behaviour.

Some research that focuses more on the quantity of screen time has found that increased screen time decreases prosocial behaviour. In a sample of children in Japan, children who watched more television at 18-months were reported by their parents as showing less prosocial behaviour at 30-months, though at age 30-months there was no concurrent association between the variables (Cheng, Maeda, Yoichi, Yamagata, & Tomiwa, 2010). Recently, Skalická, Hygen, Stenseng, Kårstad, and Wichstrøm (2019) found that in a large sample of 960 children in Norway, parent-reported screen time at age four-years was related to lower emotion understanding at ages six-years (r = -.11, p < .05) and eight-years (r = -.11, p < .05), but was not related to concurrent emotion understanding. These correlations were weak, but significant, suggesting that though screen time may have played a part in disrupting socialisation of emotion understanding, screen time was not hugely detrimental in this sample. Overall, however, there is not sufficient research on very young children and television, especially investigating observed prosocial behaviour in naturalistic environments, to establish how prosocial development may be helped or hindered by the quantity of screen time. The current project aims to address this notable gap in the literature utilising longitudinal data to investigate associations between screen time quantity and observed prosocial behaviour at two time-points.

5.1.2. Screen time as a socialising agent. Using an alternative view, television watching and other interactions with screens may act as socialising agents. Indeed, if content had been aimed to shape emotion understanding, there may have been a

weakened negative association between screen time and emotion understanding in the aforementioned Skalická et al. (2019) study. One possible mechanism underlying socialisation via television hinges on imitation, a well-established learning method (Friedrich & Stein, 1973; Williamson, Jaswal, & Melzoff, 2010). Information processing theory proposes that children learn scripts via imitation for various activities, and screen content may contribute to these scripts that are then recalled for various activities (Huesmann, 1986), such as a script for what to do when people say "hello, how are you?". Theoretically, children may watch a trusted character acting in a certain way and then emulate that behaviour. If a child learns a script that is highly prosocial, he/she might enact and reinforce those scripts, creating a pattern of prosocial behaviour (Wilson, 2008).

If imitation works as a mechanism to learn prosocial behaviour from screens, it is likely also an important mechanism for antisocial behaviour learning. Indeed, Mares and Woodard (2005) found in their meta-analysis that the transfer of prosocial skills from television was somewhat weaker than antisocial and aggressive behaviours; although it should be noted that the average prosocial content on social interactions (Z_{Fisher} = .27) was not much different from the average effect of violence reported as a comparison in the Mares and Woodard (2005) meta-analysis (Z_{Fisher}= .32; Paik and Comstock, 1994). Historically, researchers and caregivers have been concerned about antisocial behaviour on screen and how it might affect behaviour. Soon after screens became commonplace in the home, research began investigating how screens may be influencing aggression (e.g., Bandura's 1963 follow-up to his 1961 Bobo Doll Experiments; Bandura, Ross, & Ross, 1963). In one early study, children who were already aggressive became more aggressive after watching aggressive television (Friedrich & Stein, 1973). Research on possible negative effects of aggressive screen content has not slowed; in their meta-analysis of 98 studies that

were published since 2009, Greitemeyer and Mugge (2014) found that violent video games increased aggression and decreased prosocial outcomes. Bender, Plante, and Gentile (2017) posited that research on aggression has moved beyond whether or not there is an effect toward identifying underlying mechanisms of any effects, and have identified several confounding variables (e.g., gender, personality, family-related variables) that moderated the overwhelming effect that screen aggression begets real-life aggression. Greitemeyer and Mugge's (2014) and Bender et al.'s (2017) findings are important for understanding the context around screen aggression and antisocial behaviour, but these studies focus on interactive screen time in older children. In addition, all of this research on aggression highlights a trend in focusing on the possible negative effects of aggressive screen content. Research on prosocial screen time is needed to catch up with aggression research and is needed to understand effects of screen content in young children. The current project attempts to update research by investigating screen time and prosocial behaviour in toddlerhood.

The research has not all focused on aggression and screens, however. Soon after the initial moral concern surrounding aggressive screen content and behaviour, researchers began examining possible positive effects of prosocial television (Coates, Pusser, & Goodman, 1976; Friedrich & Stein, 1973; Mussen & Eisenberg-Berg, 1977; Sprafkin et al., 1975). Friedrich and Stein's (1973) landmark study with 3.8- to 5.5-year-old children found that children exposed to prosocial content (as opposed to aggressive or neutral content) interacted more positively with others in their class after viewing prosocial content. This was true for low-SES children during the period of time the children were exposed to prosocial television (condition by SES F (2, 81) = 3.76, $p < .05$), however there was no condition effect of exposure to prosocial, aggressive, or neutral television in a follow-up.

Similarly Coates, Pusser and Goodman (1976) found that children gave more positive reinforcement to others after watching *Mr. Roger's Neighborhood*, a programme that focuses on friendship and kindness, than children who watched *Sesame Street*, which had a more academic approach that focused on things like number- and letter-learning ($t=2.09$, $p < .05$). In addition, Sprafkin, Liebert, and Poulos (1975) found a direct association between watching prosocial content and engaging in helping behaviour in a game after viewing (prosocial Lassie vs. neutral Lassie $t= 2.08$, $p < .05$; prosocial Lassie vs. Brady Bunch $t= 2.79$, $p < .01$). However, neither Fredrich and Stein (1973) or Coates, Pusser and Goodman (1976) found any association with home viewing patterns and prosocial behaviour. The lack of association here suggests that there were only immediate effects of prosocial behaviour. Importantly, since these early studies, screens have become much more prevalent in the home, as well as more available outside of the home. Associations between at-home screen time and prosocial behaviour may, therefore, have likely increased in magnitude. These studies laid important groundwork for studying the effects of prosocial television, but more updated research that considers increased media usage and that investigates prosocial behaviour longitudinally after viewing prosocial content rather than directly after viewing prosocial content is needed.

In more recent research, researchers have found mixed results in how children respond to prosocial television (Cingel & Krcmar, 2017; Mares & Acosta, 2008), however this research has not directly investigated prosocial behaviour. In a study of 101 four-and-a-half to six-and-a-half-year-old children, Cingel and Krcmar (2017) found that children had more negative views of violence after watching television with a moral lesson that was made salient ($\eta_p^2 = .08$). However, in a smaller study of 64 five- to six-year-old children, Mares and Acosta (2008) found that children were not able to comprehend moral lessons in popular

television, even after the moral lesson was reiterated by researchers. Researchers must continue to investigate how these changes in society (i.e., children having access to more programmes and in a wider variety of places) are affecting how young children learn prosocial skills and enact prosocial behaviour. The current study aims to do this work that is important for theory, policy, and an empirical body of work by investigating associations between what children watch in their everyday lives and observed prosocial behaviour in naturalistic contexts.

Importantly, most of the research that has been done examining prosocial television has hinged on the general prosociality of programmes and general prosocial responding in social situations after children viewed them. These studies suggest global effects of watching content that is generally prosocial. However, if imitation underlies any effects of prosocial behaviour, any effects should be content-specific. Contrarily, since children are unlikely to find themselves in situations that are identical to those in which their favourite characters do and as is suggested in prior research, there may be some global benefits to watching characters be generally helpful, generous, and comforting. A study which focused on book reading found that, compared to 60 18-month-olds, 60 24-month-old toddlers were able to imitate an action sequence introduced in a picture book when the testing context (testing room) and stimuli (exact pieces of the rattle children were creating) were changed (Simcock & Dooley, 2007). In another study of toddlers, Brito, Barr, McIntyre, and Simcock (2012) found that 24-month old children were able to remember and imitate specific information they learned from books and videos four weeks later, with no differences in recall between media, suggesting a strong similarity between story books and films. This suggests that, by the age two years, children were able to be flexible with the information they gleaned from the media. The current study utilises detailed coding of the content

children watch in their everyday lives and naturalistic prosocial outcomes in a different context to address how prosocial television content, considered in a global rather than specific way, is related to prosocial outcomes.

5.1.3. Transfer deficit. It is well established that there is a transfer deficit of specific learning in toddlerhood. That is, toddlers at least up to age three years have a difficult time recreating something they see on a screen, such as how to build a puzzle, into real life (Hipp et al., 2017). This deficit may be present for prosocial behaviour as well as the more academic-like information typically shown to children during studies that investigate the transfer deficit. The current study utilises detailed coding of all of the content children reportedly watched to investigate whether children are able to learn from prosocial content. If there are no associations between screen content and prosocial outcomes, this will be good evidence that the transfer deficit exists for prosocial behaviour. Though the current study did not investigate directly whether children are able to retain specific social behaviours and enact them after watching, the current study investigates naturalistically whether toddlers' prosocial skills differ by their screen content; if prosocial content does not influence prosocial behaviour, there would be evidence for a more naturalistic transfer deficit.

In addition, if the transfer deficit is seen for prosocial learning, the larger risk to children's prosocial development would not be watching content that was not prosocial enough, but rather the impact of screen time in taking children away from important real-life socialisers. Indeed, this risk of missing out could be problematic regardless of the effectiveness of screen content, but good prosocial content may serve to provide some of the missing socialisation from the 3D world. The current study addresses these questions by including screen time measurements at three time-points and looking at longitudinal effects

of screen time. If screen time is keeping children from important socialisation, it is expected that more screen time will be related to less prosocial behaviour at concurrent and future time-points.

5.2. Mitigating the transfer deficit

5.2.1. Context. The transfer deficit decreases the efficacy of television for learning rote information such as building a puzzle, however little is known about the transfer deficit in terms of prosocial learning. All screen time is likely not created equal – content and context play an important role in how well television socialises and may attenuate or exacerbate some of the negative effects of spending less time doing more socialising activities. Interestingly, there are content and contextual factors that may decrease the transfer deficit. For example, previous research reported in Chapter 4 highlighted the potential benefits of co-viewing programmes with parents (e.g., Zack & Barr, 2016; Linebarger & Vaala, 2010). Studies have found that co-viewing increases language learning (Linebarger & Vaala, 2010), and that high-quality parent-child interactions during screen viewing increases learning from screens (Zack & Barr, 2016). Chapter 4 reported that 89% of children in the current study co-viewed television with their parents at least some of the time when they were 24-months-old. There was not enough variance to investigate whether viewing with parents made a difference for prosocial outcomes, since so many children co-viewed with their parents. Future research should investigate how much children watch with their parents to establish whether children who are more often accompanied whilst viewing screens are able to learn more from screen viewing. In addition, future research should investigate the quality of interactions between parents and children viewing screens together and whether this influences the transfer of prosocial information.

5.2.2. Format features of television. Format features might also help mitigate the transfer deficit and encourage prosocial learning. Chapter 3 outlined various features of television and film content that may help to decrease the transfer deficit in detail. These include, but are not limited to, conversational techniques, animation, and pacing. Conversational techniques between on-screen characters or narrators and audience members have been shown to improve the transfer of prosocial content (e.g., Linebarger, Brey, Fenstermacher, & Barr, 2017). The mechanism underlying this association is likely the ability of conversation to address children directly and ask them to specifically think about emotions and prosocial behaviour on screen, making these behaviours and feelings perceptually salient. Programmes with conversational techniques often also encourage children to engage in prosocial behaviour by asking for "help" with various things, such as shouting someone's name to get their attention (such as in *Swashbuckle)*. The current study developed a rigorous coding scheme of television programmes which is used to investigate whether watching programmes with high levels of conversational techniques is related to prosocial behaviour in a completely different context.

Further, pacing likely impacts transfer (Wright et al., 1984), though it is unclear whether slow- or quick-paced programmes are better for children at age two years. For older children (ages four- to nine-years), slower paces (longer scenes) were related to more recall (Wright et al., 1984), but quick pacing (shorter scenes) increased attention for children aged two-years and younger (Anderson & Pempek, 2005). Thus, shorter scenes may be better for two-year-old children's learning, especially in light of the higher prosocial content in fast-paced programmes (programmes with shorter scenes), as reported in Table 3.3, p 102. The current study tests whether shorter scenes, on average, are related to more prosocial behaviour.

Animation may also make a difference (Schmitt et al., 1999), as animated programmes may be more difficult to transfer because the salience of live-action characters may be stronger. Improving the salience of information increased transfer from screens (e.g., Kirkorian, Pempek, & Choi, 2017). Thus, live characters may be easier to learn from as the salience of their actions could be stronger than animated characters'. In addition, live-action programmes often take place in familiar settings where a child may be able to imitate a behaviour as it occurred on screen; familiar settings may also increase the salience of information. However, there is little research examining whether animation or live-action programmes are easier to transfer has been conducted in the last twenty years. However, as noted in Chapter 3, most children watched a high proportion of animated content and there was limited variance (M = .83, SD = .19), and so animation was not further investigated in this chapter due to ceiling effects.

5.3. Current study

The current chapter aims to bring together the ideas of the previous three chapters, asking four main questions:

1. Do toddlers who engage in more screen time show less prosocial behaviour as expected, suggesting that screen time may be interfering with socialisation?
2. Does prosocial content moderate the associations between screen time and the prosocial outcome variables – could screen time be a socialiser for prosocial behaviour, or is there a transfer deficit for social information, as previous research has shown for other types of information?
3. Do format features, specifically conversational techniques and pacing, mitigate a transfer deficit? 2-way interactions are expected such that children who watch more prosocial and conversational television will have higher scores on prosocial

outcomes and children who watch more prosocial and faster-paced television (programmes with shorter scenes, on average) will have higher scores on prosocial outcomes.

Method

5.4. Measures

5.4.1. Prosocial behaviour. As discussed in Chapter 2, prosocial behaviour is a complex and multi-faceted construct. In addition, though there was stability in empathic concern between 24- and 36-months, the association was not perfect, and concurrent and longitudinal associations are key components of the current research. Further, the number of data points included in analysis was maximised by investigating them each separately (see the method section of Chapter 2 for explanations about missing data). Therefore, three global prosocial outcome measures were examined separately. The global empathic concern scores at 24- and 36-months described in Chapter 2 were included as the first two outcome variables. These scores reflect how much concern toddlers showed for the crying baby. Importantly, to achieve the highest score (3), children had to show some prosocial behaviour toward the crying baby. The third outcome measure was how many stickers children shared during the dictator game at 36-months, which captures an aspect of prosocial behaviour that is distinct from empathic concern.

5.4.2. Screen time. Mother- and father-ratings of amount of screen time per day were averaged at each time point (14-months, 24-months, and 36-months). The measures section in Chapter 4 details how these quantities were calculated and Figure 4.1, p 131, reported the distribution of screen time at each time point.

5.4.3. Screen content and format. As described in Chapter 3, several screen content and format variables were created for each child based on the novel detailed content coding

of all of the programmes children reportedly watched. The grand mean of prosocial behaviour content (average prosocial behaviours per minute across all programmes/films children watched) was included as the prosocial content variable, and the grand mean of antisocial content was included as a control in associations. Of the format features that may mitigate the transfer deficit of information seen on screen to the real-world, the three that are hypothesised to make the most impact are conversational scenes, animation, and pacing. As discussed in Chapter 3, there was not much variance in the proportion of programmes children watched that were animated in the current sample. Therefore, only two format variables were included in the current chapter: The grand mean of scene lengths (average length of scenes across programmes/films, to conceptualise pace) and the proportion of conversational scenes (for details see measures section in Chapter 3; for distributions see Table 3.3, p 102).

5.5. Analysis plan

First, to answer whether toddlers who have higher screen time engage in less prosocial behaviour, linear regressions were conducted with each empathic concern at 24-months, empathic concern at 36-months, and sharing at 36-months as outcome variables and screen time variables for each time point prior and concurrent as independent variables. For empathic concern at 36-months, empathic concern at 24-months was included in the model to control for the weak but significant stability of empathic concern.

Next, to investigate whether prosocial content and format features (conversational scenes and scene length) influenced prosocial outcomes – indeed, to investigate whether there was a naturalistic transfer deficit and whether format features could mitigate one, if so, correlations were run between each content and format variable and each empathic concern at 24- and 36-months and sharing at 36-months. To assess the unique contribution

of prosocial content and to control for the weak but significant association between prosocial and antisocial content in children's television diets (see Table 3.3), the grand mean of antisocial behaviours per minute was controlled for in correlations between prosocial content and outcome variables.

Next, to establish whether these variables interacted with each other and/or screen time quantity, regression analyses were run using the process macro for SPSS (Hayes, 2017), with empathic concern at 24- and 36-months and sharing at 36-months were outcome variables. Separate regressions were run for each proportion of conversational scenes and grand mean of scene length. As noted, the proportion of programmes that were animated had low variance in children's television diets; therefore, this format variable was not further investigated. Screen time at 24-months (the time period for which the content variables correspond) and prosocial content were included in each regression. For regressions investigating empathic concern at 36-months, empathic concern at 24-months was included as a covariate to control for stability in empathic concern (reported in Chapter 2). Antisocial content was controlled for in all regressions.

Results

5.6. Screen time quantity and prosocial behaviour

Regression analyses revealed no significant concurrent or longitudinal associtions between screen time quantity and any of the prosocial outcomes, $|\beta|$s $\leq .211$, *p*s $\geq .136$.

5.7. Concurrent associations between content and format and 24-month empathic concern

Table 5.1 reports correlations between empathic concern and sharing and television content characteristics (grand mean of prosocial behaviours per minute (controlling for grand mean of antisocial behaviours per minute), grand mean of length of scenes, mean

proportion of conversational scenes, and proportion of animated programmes). Notably, scene length and concurrent empathic concern were inversely related, $r(142) = .17$, $p = .047$, such that shorter scenes were related to more empathic concern.

Table 5.1. Pearson Correlations Between Children's Characteristics Across all Programmes Watched and Prosocial Outcomes

Television Diet Characteristic	24-month empathic concern	36-month empathic concern	36-month sharing
Grand mean prosocial behaviours per minute, controlling for grand mean of antisocial behaviours per minute	-.045	-.047	.098
Grand mean pace (mean of average length of scenes)	-.166*	-.019	.063
Mean proportion of scenes that were conversational	.039	-.019	.069

*p<.05

Separate regressions were run to investigate whether the proportion of conversational scenes, proportion of animated programmes, and/or the grand mean of length of scenes were related to prosocial behaviour at 24-months. Hypothesised two-way and three-way interactions were tested in these regressions.

5.7.1. Conversational scenes. Regressions were run including the mean proportion of conversational scenes, grand mean of prosocial behaviours per minute, and screen time at 24-months as predictors and empathic concern at 24-months as the outcome variable; the grand mean of antisocial behaviours per minute was controlled for. There were no significant main effects or interactions for empathic concern at 24-months, $ps \geq .126$, or sharing, $ps \geq .127$.

5.7.2. Pace. Regression models were run including the grand mean of scene length of programmes children watched, the grand mean of prosocial behaviours per minute, and screen time at 24-months as independent variables and empathic concern at 24-months as

the dependent variable. Antisocial content was covaried. Most effects were not significant, *p*s ≥ .208. There was a main effect of pace, *b*(8, 132) = -.01, *p* = .026; Model R^2 = .058, *F*(8, 132) = 1.18, *p* = .315, such that shorter scene length was related to higher empathic concern, in line with correlations reported above.

5.8. Longitudinal associations between content and format and 36-month empathic concern and sharing

Table 5.1 reports associations between screen content and format variables (for screen time at 24-months) and empathic concern and sharing at 36-months. There were no longitudinal associations between screen time content at 24-months and prosocial outcomes at 36-months.

5.8.1. Conversational scenes. Regressions were run including the mean proportion of conversational scenes, grand mean of prosocial behaviours per minute, and screen time at 24-months as predictors and empathic concern at 36-months as the outcome variable. Empathic concern at 24-months and the grand mean of antisocial behaviours per minute were included as co-variates. There were no significant main effects or interactions, *p*s ≥ .115.

Regressions were also run including the mean proportion of conversational scenes, grand mean of prosocial behaviours per minute, and screen time at 24-months as predictors and sharing at 36-months as the outcome variable. Antisocial content children watched was controlled for. There were no significant main effects or interactions, *p*s ≥ .303.

5.8.2. Pace. Regression models were run including the grand mean of scene length of programmes children watched, the grand mean of prosocial behaviours per minute, and screen time at 24-months as independent variables and empathic concern at 36-months as the dependent variable. Empathic concern at 24-months and antisocial content were

included as covariates. There were no significant effects for empathic concern at 36-months, *p*s ≥ .827.

Finally, a regression with the grand mean of scene length of programmes, the grand mean of prosocial behaviours per minute, and screen time at 24-months as the independent variables and sharing at 36-months as the dependent variable, covarying for antisocial content was run. Most effects were not significant, *p*s ≥ .131, but there was an interaction between pace and prosocial behaviours per minute, $b(8, 113) = .318$, $t(114) = 3.24$, $p = .002$; Model $R^2 = .102$, $F(8, 113) = 4.09$, $p < .001$, such that programmes with longer scenes and that were highly prosocial resulted in more sharing (see Figure 5.1).

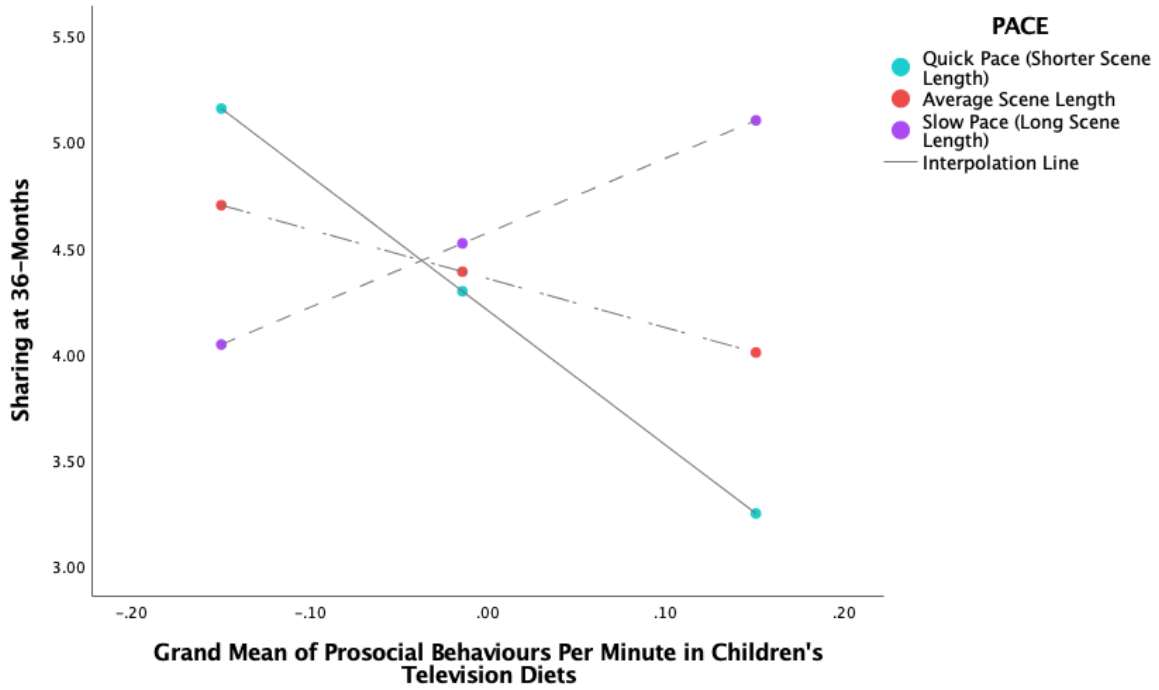


Figure 5.1. Longer average scene length predicted sharing a year later for children who watched high levels of prosocial content.

Discussion

In the current longitudinal study of toddlers, there was not sufficient evidence that screen time was detrimental for prosocial behaviour at 24- or 36-months, and prior screen time was not related to prosocial outcomes. These associations were not moderated by prosocial content. There was evidence that a naturalistic transfer deficit of prosocial television and film content occurs in toddlerhood. Interestingly, and contrary to the hypothesised interactions, slower-paced programmes interacted with prosocial content to increase sharing a year after children's screen diets were reported. Contrary to expectations, conversational programming did not interact with prosocial content to predict prosocial behaviour. Each of these findings will be discussed in turn.

5.10. Screen time quantity and prosocial behaviour

Screen time was not related to prosocial outcomes. These findings contrast from those found in Japan with 18- to 30-month-old children (Cheng et al., 2010). One possible explanation for this difference may be that the Cheng study utilised parent-reported prosocial behaviour, and the current study was able to investigate specific, observed aspects of prosocial behaviour. The findings in the current study suggest that a large quantity of screen time is not necessarily detrimental to empathic prosocial behaviour, either due to a lack of other social or parental input or due to an overarching negative message television is sending about social behaviour. Specific to empathy, television may actually be helpful as it portrays characters in a number of situations, and so children may learn about how people respond when either pleasant or unpleasant things occur, thus building an understanding of others' emotional states. Therefore, a lack of any association between screen time and empathic behaviour may suggest that, though television may take away from well-guided social interactions, there may be some positives for empathy in exposure to stories and

emotions. These positives, however, may not be any more powerful than well-guided social interactions, therefore leaving a null effect of television. It has been demonstrated that children are able to emote with a character on a screen (see Fink, Heathers, & de Rosnay, 2015 who used video vignettes to elicit empathic responses from five-year-old children), thus watching characters experience a variety of emotions, experiencing emotional responses to them, and learning to handle those responses may be good practice for sharing emotions in real life. However, it is important to consider all of these associations and lack thereof in light of other aspects of screen time, including context and content.

5.11. Screen content and prosocial outcomes

5.11.1. Prosocial content and prosocial outcomes. Prosocial content was not directly related to prosocial outcomes, and did not moderate the associations between screen time and prosocial behaviours. These findings suggest that the simple presence of prosocial behaviour on screen is not sufficient to teach children prosocial lessons. Notably, it could be that prosocial content counteracts missed prosocial socialisation due to screen time, resulting in a null effect. However, findings that prosocial content was not related to prosocial outcomes on its own, regardless of screen time, suggest that there is a transfer deficit seen in previous research with academic outcomes (e.g., Hipp et al., 2015) being present for social outcomes, as well. The lack of associations between prosocial behaviour outcomes and prosocial behaviour on screen may be due to a lack of specifically imitable behaviour. Huesmann's (1986) theory suggests that children create scripts that relate to certain situations; for example, Peppa Pig helping her brother George with his goal of finishing his dinosaur puzzle may not be easily adaptable to helping an unknown crying baby. To help disentangle whether prosocial screen time in toddlerhood is globally unhelpful or whether specific content leads to similar outcomes, future research should

investigate prosocial content in relation to directly relatable prosocial behaviour. Though these findings were unexpected, there are several plausible explanations.

First, the transfer deficit, which the current study demonstrated, may simply be too strong at twenty-four months for screen content to make much of a difference. Indeed, this deficit is well recorded, even when asking even older children to repeat a task they saw on screen (e.g., Lauricella, Barr, & Calvert, 2016; Zimmermann et al., 2015; Zimmermann, Moser, Lee, Gerhardstein, & Barr, 2017). Kirkorian, Pempek, and Choi (2017) argue that the transfer deficit declines by age three years; the current study supports that there is still a strong deficit at age two years. Furthermore, the current study suggests that this deficit may be implicated in learning social skills as well as in the previously-studied academic skills from screens.

Second, what children will take away from screens depends heavily on the difficulty of the learning task and the relevance of screen content to the real-life academic or social situation (Kirkorian, Pempek, & Choi, 2017). It could simply be that the prosocial content children were watching did not easily translate into social situations that they encounter every day. A key strength of the current study was that both the television content measures and the prosocial outcome measures were more naturalistic than in previous research. However, what children saw on screen did not necessarily map onto the naturalistic prosocial behaviour that was measured, specifically the situations children were tasked with during the Crying Baby Paradigm and sticker-sharing paradigm. What is seen on screen may similarly be different from the prosocial behaviour children engage in during their everyday lives. Some of the prosocial behaviour children watch on screen was very complex, involving sophisticated emotion understanding or high levels of cooperation. There was also a lot of prosocial content that was fantastical and valorous – it makes sense

that children would have a difficult time transferring a prince killing a dragon to save Sleeping Beauty into caring for a crying baby. This distinction is important for content creators and parents to consider. It may be particularly important to prioritise prosocial content that is relevant and easily imitable over grand gestures because children have so much screen input.

Third, children may be oversaturated with content and, as a result, the content they experience does not influence their behaviour. In the early studies of the effects of prosocial television content (Coates et al., 1976; Friedrich & Stein, 1973; Mussen & Eisenberg-Berg, 1977; Sprafkin et al., 1975), children were shown specific prosocial content and then their prosocial behaviour was observed directly afterward. Children in these studies were most likely exposed to less content, possibly because fewer programmes were on television and/or children's programming was on for less time than the constant streaming available today. These studies were also conducted before television was made portable with tablets and phones and the internet. Therefore, it is highly probable that children today experience such diversity of input that any aspect of content, here investigated as prosocial behaviour, is unlikely individually to exert a powerful impact. Indeed, the current study did not investigate how much of each programme children watched; therefore, though it is possible to look at the amount of prosocial content assuming all programmes were watched in equal measure, understanding the proportion of highly prosocial content children watch would add precision to the measure of prosocial content.

5.11.2. Format features and prosocial outcomes. There were limited associations between screen time format and prosocial behaviours. When looking at simple correlations, pace and empathic concern at 24-months were related such that shorter scenes were related to more empathic concern. This remained significant when considered in a

regression model alongside prosocial content and conversational techniques, but did not interact with prosocial content to predict empathic concern. This association suggests that at 24-months of age, a quicker pace (shorter scenes) is helpful for garnering empathic concern, perhaps because visual and auditory changes elicit attention (Anderson & Pempek, 2005). This finding contrasts with Wright et al.'s (1984) finding that low-paced programmes had higher recall in older children, suggesting that there may be a later shift than age two in best practice for content pacing for how it relates to emotion learning.

In contrast, pace and prosocial behaviours per minute interacted to affect sharing at 36-months such that slower-paced programmes that were highly prosocial resulted in more sharing a year after children were reportedly watching these programmes. This association suggests that when there are more prosocial behaviours to digest, a slower pace is needed to learn these behaviours. However, the lack of main effects of either prosocial content or pace on sharing suggests that there is something unique about having a highly prosocial slowly-paced programme (with long scenes) that lends itself to mimicry and the scripts children create for sharing situations. This idea supports Wright et al.'s (1984) finding and suggests that a lot of possible information to recall, shared with long scenes, lends itself to being utilised a year later. The contrast between this longitudinal effect and the concurrent effect that favoured shorter scenes may also have to do with retention, but may also have to do with the type of prosocial behaviour being mimicked (e.g., empathic concern vs sharing). Overall, it appears that shorter scenes may be better for short-term benefits in empathic concern, but longer scenes had more of a long-term impact in sharing. Importantly, sharing was not measured at 24-months, so there may have been a concurrent interaction, as well; this should be investigated in further research.

Surprisingly, conversational techniques and prosocial outcomes were unrelated. These findings contrast with prior research that illustrates that conversational elements help in learning from screens (Linebarger et al., 2017; Zimmermann et al., 2015). Characters conversing about what is happening and bringing the audience into the conversation may help to prime children to be aware of the social elements of the situation. In addition, conversational techniques may invite children to be prosocial toward characters – even if content is not overtly prosocial, conversational characters may invite audience participants to be. For example, Dora (in *Dora the Explorer)* may ask for some help identifying which path is green when looking at different possible paths to take to get where the characters are going, and then say, "thank you for your help." Situations like these offer children opportunities to practice being prosocial and normalise helping others, which may aid in giving them the expertise they need a year later when they were confronted with a baby who needs help. Perhaps some of this learning occurs when characters were distressed and spoke to the audience about their distress (or even asked the audience for comfort), which in turn helped children grow their emotion understanding, which they may have used during the Crying Baby Paradigm.

However, even if this learning was taking place, it was not enough to influence prosocial behaviour. This may be due to the large amount of conversation that often occurs in conversational programmes. Just because a narrator or character was conversing with the audience does not mean these conversations had anything to do with prosocial behaviour, and so there may have been a saturation effect such that programmes with higher conversational scenes had too much information for children to glean prosocial understanding. Indeed, as reported in Table 3.3, p 102, there was a negative correlation between prosocial content and conversational scenes in children's television diets,

suggesting there is a variety of conversation occurring, and it is not always prosocial. Importantly, coding conversational scenes, researchers did not identify whether the conversation had anything to do with prosociality, either within the story or by asking audience members to act prosocially. Future research should investigate exactly what conversations between on-screen characters or narrators and audience-members are having, and whether conversations somehow related to prosocial behaviour are related to prosocial outcomes.

Conclusions

In all, the lack of many associations found in the current study suggests that screen time is neither particularly beneficial for children's prosocial development, nor wholly detrimental for prosocial behaviour in toddlerhood. Crucially, though, pacing appeared to help children learn from prosocial screen time, which should be considered moving forward. The implications of these findings for researchers, parents, and content-creators are discussed in the final overall discussion chapter.

Chapter 6. General Discussion

The current work points to three main points:

1. Screens are a part of family life from an early age, and parents and content-creators have not caught up with the trend. There are individual differences in family screen time usage, but very few gender differences.

2. Toddlers are capable of showing empathic concern from at least age two-years and being generous from age three-years, but there is a range of responsiveness that shows individual differences in responding.

3. Screen time does not appear to either help or hinder prosocial development in toddlerhood, either by taking children away from other socialising agents or by teaching prosocial behaviour on screen. There is good evidence for a transfer deficit from screens to real-life, but appropriate pacing of programmes may diminish this deficit.

6.1. Summary of results

6.1.1. Observed prosocial behaviour. Prosocial behaviour at 24- and 36-months showed a number of interesting patterns. For the most part, toddlers were able to respond empathically to the crying baby, and there were individual differences in responding at 24-months and 36-months, though at 36-months children were less responsive. Individual differences in empathic concern were relatively stable and personal distress decreased from 24- to 36-months. Attention to the crying baby at 24-months was related to empathic concern at 36-months, revealing a developmental trajectory of empathic responding moving from interest to comforting. Personal distress and empathic concern were distinct and unrelated. The only gender difference in empathy was in labelling the baby's emotion, which girls did more than boys at 24-months of age. Turning to sharing, 36-month-old children did share at a relatively high rate; boys shared more than girls, suggesting that the

gender differences seen later in life in the opposite direction may be the result of socialisation forces. Sharing and empathy were not related when confounds including gender and the location of the second visit were considered, in line with the idea that different prosocial behaviours are differently manifest and developed.

6.1.2. Television content. Across all screen time, 24-month old children watch a wide variety of programmes. Only a small number of programmes popular for a large group of children in the study – many programmes were watched by only one or two children. Of the programmes children watched, only three of 66 Common-Sense-Media-rated programmes were rated as appropriate for two-year-olds, implying that the vast majority of content consumed by children at 24 months of age is not age-appropriate. Of the five most popular programmes, boys and girls watched four of them in equal number. The only exception to this was *Thomas and Friends,* which was watched by boys statistically significantly more often than girls.

The amount of prosocial and antisocial behaviour portrayed varied greatly between programmes, but prosocial content and antisocial content within programmes were not related. The lack of association was unexpected, as prior work has suggested that antisocial behaviour precedes its prosocial resolution.

With respect to the structural features of children's programmes, the pacing and setting varied; most programmes were animated, but there were also several that were live-action in format. These structural features were associated with prosocial and antisocial content: there were more prosocial and antisocial behaviours in animated content; conversational formats were negatively related to prosocial and antisocial content; pace was negatively related to prosocial behaviours per minute such that shorter scenes were related to more prosocial content.

Parents are not very good at identifying the extent to which programmes are prosocial, but are better at identifying programmes with antisocial content. On the whole, parents were generous in their ratings of programmes, identifying them as largely prosocial.

6.1.3. Technology diets. Children's diets of programming varied, but some features clustered together. Children who saw a higher proportion of prosocial acts per minute also saw a higher proportion of antisocial acts per minute; this finding contrasts with the finding that within programmes, there was no association between prosocial and antisocial content. This is likely due to a propensity to watch more narrative content that has a higher proportion of behaviour, as opposed to more instructive content that focuses on sharing information and fewer prosocial or antisocial behaviours. Formal features in children's diets hung together in similar ways to individual programming; children who watched programmes with longer scenes also watched programmes with more conversational scenes and animated content was less likely to use conversational techniques. Pace and animation were unrelated. Formal features did not cluster together in ways consistently enough to create a latent variable, suggesting that even though there are trends, programming is unique enough that elements of children's screen diet needed to be considered separately. Boys and girls watched the same amount of prosocial and antisocial content at 24-months old.

6.1.4. Technology in the home. Technology was pervasive in children's homes from as early as 14-months of age, and likely before, with screen time increasing with age from 14- to 24-months and from 24- to 36-months. Children who engaged in more screen time in early toddlerhood were also in front of screens more often in late toddlerhood; by the time they were 36-months old, 100% of children engaged in at least a short amount of screen time per day. Most children engaged in application use at 24-months of age. However, most

screen usage at all time points was television, and so the focus of this dissertation was mostly television usage – screen time as a whole was used in moderation analyses because interviews revealed that much of children's touch screen usage was passive watching of videos and television programmes. At 24-months, most children used some video chatting, mostly to family members.

Most parents, by the time their child was 24 months old had rules about screen time, but the majority of these were quite vague and did not involve specific limitations with respect to duration of screen time per day. Overall, parents tended to agree on how often they enforced screen time limits. When toddlers were 14-months old, mothers who spent more time caring for their children disagreed significantly more with their partners on how often limits were enforced than mothers who spent less time with their children – at this time-point mothers enforced rules more often than their partners did, on the whole, though these differences were not terrifically stark. Parents' attitudes toward and intentions around screen content were generally positive – earlier in childhood, parents were keen to allow screen time in order to educate their children; this changed as children got older – mothers especially utilised screen time to keep children busy. Indeed, though many parents watched programmes with their children at 24-months, most did, for at least some of their children's screen time, spend their child's screen time in another room or in the same room doing something else.

6.1.5. Technology and prosocial behaviour. In the current study, screen time and prosocial outcomes were not significantly associated, suggesting that screen time is not taking children away from socialisation of prosocial skills or real-life situations that help to foster prosocial behaviour to a detrimental extent. There did appear to be a transfer deficit of prosocial skills from screen to real-life, because there were no associations between

prosocial content and prosocial outcomes, regardless of time spent in front of screens. Importantly, however, suggesting there is a transfer deficit implies that learning occurred and was simply not retained. Further research is needed to investigate whether learning happened in the first place, perhaps with more direct lab-based research with specific social skills shown to children followed by observations looking for those behaviours.

Pace did, however, have an impact on prosocial learning from screens. There was a main effect of pace on empathic concern at 24-months such that shorter scene lengths resulted in more empathic concern, regardless of amount of screen time. This may be due to toddlers orienting better to more quickly-paced programming and therefore getting more out of short scenes. In contrast, pace and prosocial content interacted to predict sharing at 36-months, such that children who watched longer scenes that were highly prosocial shared more. It could be that shorter scenes are better for short-term transfer and longer scenes are better for long-term retention and behavioural change, though this was only true for sharing, and therefore may be domain specific.

6.2. Implications and future directions

There are several key implications of this work. Notably, findings presented in this thesis have repercussions for policy makers, screen content creators, families, and researchers.

6.2.1. Policy. For policy makers, the study findings are mostly uplifting. Screen time in toddlerhood does not appear to have overarching detrimental effects on prosocial behaviour. Guidelines in both the UK and the USA suggest little to no screen time for very young children, though this is based on a small body of evidence. The current findings do not support these guidelines – screen time appears to be relatively innocuous, at least with respect to its influence on children's prosocial behaviour. Notably, the current study only

evaluates screen time's contribution or lack thereof to prosocial development, which, although an important developmental goal in toddlerhood, is not the only developmental outcome that could be investigated in relation to screen time. Therefore, policy makers and those who work with parents should continue to be cautious with screen time recommendations. When considering content recommendation, there does not seem to be a big difference in prosocial behaviour by content, which suggests that any children's television programming analysed in this report should be acceptable. Some content may be better, however, and more content that is targeted at toddlers is needed.

6.2.2. Content creation. Thus, the current research also informs content creation. Strikingly, most content that children in the current study were viewing was created for older children; there is a dearth of content for toddlers, perhaps due to guidelines that recommend children aged two and under not engage with screens. These guidelines may encourage content producers to create content that is pitched at older children. Content that is made for children aged three and above may be appropriate for toddlers, but is not pitched at toddlers' level. This is a problem, as children under age two-years are engaging with screens, but do not appear to get much out of it. This inefficacy of screen time is perhaps due to an inability to fully comprehend the content, or the fact that content does not address developmental/learning goals pertinent to toddlerhood. Television content that is fast-paced but still structured and that utilises conversational techniques as often as possible would benefit toddlers and families. In addition, content that portrays key experiences of toddlers and calls attention to information that toddlers are learning (such as prosocial behaviour) is needed. It is possible that if children were watching programmes that were created for them, there would have been a stronger positive effect of prosocial content.

In addition, there is inconsistency in types of prosocial content portrayed, and a lack of some varieties of prosocial behaviour. For example, sharing is an important learning goal for toddlers and preschool children, but there is a surprising lack of sharing portrayed on screen. Especially considering the direct inverse association between screen time and sharing behaviour, the lack of sharing on screen should be remedied. In addition, cooperation is often shown in tandem with aggressive behaviour, showing characters banding together to ward-off aggressive others by using physical force; it would be helpful to include non-physical and non-aggressive cooperation. In contrast, helping behaviour, either when helping a character work toward a specific goal or in helping a character who has fallen over or dropped something, is shown very often, and is frequently praised on screen. Showing a variety of behaviours can only be helpful for children building an arsenal of prosocial tendencies, but content creators should take care to ensure that there is a range of prosocial content, and that this variety is seen within and across programmes.

6.2.3. Family life. Perhaps most importantly, this research has strong implications for families with toddlers. First, a level of normality can be attributed to exposing children to screens. Though the current sample is not representative for many reasons, the prevalence of screen use from a very early age does suggest there is a tendency for children to be exposed to screens at least from toddlerhood. However, just because this sample of highly-educated, generally affluent families are allowing screen use does not mean it is helpful.

Families may also be encouraged by the overall lack of gender differences in screen time experiences. In a society where ideals are shifting such that gender-stereotyping is becoming less popular, this trend is encouraging. The overall lack of significant differences here also suggests that there is equivalent content that is enjoyable for all toddlers, regardless of gender and that the variance in prosocial and antisocial behaviour found in the

content children are watching is not related to boys enjoying more antisocial behaviour or girls appreciating more quaint and convivial scenes. However, some of the inability to establish any differences may be due to programmes that are more feminine having more antisocial behaviour than might be assumed, such as in *The Little Mermaid*. One might expect that a film about a mythical mermaid falling in love with a prince there is not much antisocial behaviour, but there is a shark attack, eels flipping a canoe, and a maniacal octopus who is outwardly aggressive to anyone she comes across. Therefore, some of the lack of gender difference may have less to do with a more gender-blind society and more to do with the high prevalence of antisocial behaviour on screen. Regardless of the underlying mechanisms, however, the overarching theme is that boys and girls are getting the same sort of television experience in toddlerhood, both in their screen content and screen context; boys and girls engage with the same amount of screen time and parents watch with all children with the same frequency. In addition, parents' reasons for allowing television did not differ by child gender. Overall, then, boys and girls appear to have the same screen time experiences across toddlerhood.

Like policy creators, families can be reassured that screen time does not seem to be influencing children's prosocial tendencies on the whole, but should still exercise caution with their screen allowances, based on what is known about screen time and other developmental outcomes. Furthermore, the programmes included in this study are specific to the study sample and do not necessarily reflect all of the programmes children may be watching, especially if they have older siblings. Parents do seem to be considering screen time guidelines and habits for their households, but interview results indicate that parents could be more intentional about planning. As part of this planning, parents should carefully consider the content their children are viewing. Parents' ratings of programmes differed

from researchers' ratings when they did not watch with their children, suggesting that parents' understanding of the content their children are watching is limited. If parents understood more thoroughly the content their children were viewing, they may be able to help children retain and use positive behaviours they see on screen, by referencing these on-screen scenes in real-life situations and/or by ensuring their children are exposed to the best possible models.

Paying more attention to what children are watching may also help parents accomplish their goals for their children's screen time. Results of the screen time reason questions suggest that parents want their children's screen time to be educational and at least marginally beneficial; understanding exactly what their children are watching and how developmentally appropriate that content is can help parents help their children learn. Helping parents appreciate that social learning is important in toddlerhood and highlighting which content is highly prosocial will aid parents in their goals for educating their children with screen-based activities. In addition, parents have the ability to effect change in content creators' habits in the way they use content, and therefore being more discerning about what content their children are watching could benefit the overall corpus of children's television.

6.2.4. Research. There are also several implications for researchers – results of the current study highlight that toddlers are able to respond empathically and act in a generous manner. These findings, and the relative success of the measures used, should inform future research investigating longitudinal precursors and consequences of early empathy and sharing. However, the measures used were imperfect, and researchers should continue to refine measures of natural behaviour, perhaps utilising the current study's findings as an aide. Indeed, the current study highlighted that empathy can be measured in the home, but

there are marked difficulties in using empathy paradigms in different settings that researchers should consider in the future. Most notably, using the crying baby paradigm in a place where children are used to hearing babies crying and are used to the adults in the room taking care of them may have influenced children's overall drop in responsiveness.

With regard to screen time measurement, the current study offers several methodological contributions to the field. First, coding content that children are already watching is possible. Though resource-heavy, this method allows for a richer understanding of what children are already watching, and researchers interested in the effects of screen time should consider this method. Second, understanding developmental trajectories of screen use can inform future research into screen time; researchers should continue to investigate how early children begin engaging with screens and how these trajectories change. Finally, the current study highlights the benefits of using mothers and fathers as windows into children's screen time. Though parents typically agreed, each parent was able to add to the overall understanding of what each child was watching and when. In addition, parents did not always agree on screen time rules – future research should continue to investigate how parents make and keep screen time rules in the home, and, when they differ, how this affects children.

The overall findings of the study also suggest that researchers should reconsider the way video is used in measurement. Several studies rely on using video vignettes to elicit emotional responses in young children and then rely on their physiological or facial responses to measure emotion regulation and/or responsiveness (e.g., Cowell, & Decety, 2015; Crespo-Llando, Vanderwert, Roberti, & Geangu, 2018; Fink, Heathers, & De Rosnay, 2015; Hepach, Vaish, Müller, & Tomasello, 2019). Though several of these studies investigate immediate physiological responses to what is happening on screen, most also

investigate how children respond after watching, either to questions or moral reasoning tasks. The wealth of technology research suggests that children do not attend well to screens (Kirkorian et al., 2017) and the current research supports the wealth of information that points to a dramatic transfer deficit from two-dimensional screens to the three-dimensional world. Taken together, it would be prudent for researchers to consider the efficacy of methodology that utilises screens to transmit information. Indeed, there is a general difficulty to replicate findings that infants prefer a helper to a hinderer (e.g., Hamlin & Wynn, 2011). This replication issue may have something to do with several studies (e.g., Hinten, Labuschagne, Boden, & Scarf, 2018) utilising video versions of the helper/hinder vignette instead of live-action puppet shows. Though there are methodological advantages, such as reducing variability in administration, by using video to prime a number of outcomes, there may be strong methodological disadvantages if children are unable to attend and respond to on-screen behaviour.

6.3. Strengths and limitations

There were several strengths to the current study, as well as several limitations that should be considered for future research. Large prospective longitudinal studies allow for dynamic and interesting measures and provide adequate power for statistical analysis. The current study had very good retention rates, providing the power needed for understanding of longitudinal effects. However, despite the large sample size, not all participants were able to complete the crying baby paradigm at the 36-month visits due to nursery regulations, as a result, information was collected about children's programming diets that could not be used to predict empathy longitudinally. Multiple imputation was not used here because 46% of children were missing the crying baby paradigm at age three, and this was mostly due to non-random situations – the nursery not allowing videotaping (Jakobsen et al., 2017). In

future, finding different ways to assess empathy in children in their childcare settings that can be live-coded will overcome this limitation.

In addition, the sample was largely heterogeneous and did not reflect the diverse population of the UK, either in family racial and cultural makeup or in socio-economic status. Screen time and prosocial behaviour may be different in different samples. Indeed, in a study of preschool (four- to five-year-old) children, Carson, Spence, Cutumisu, and Cargill (2010) found that lower SES was associated with more screen time for girls ($F(1) = 9.90$, $p < .01$, $n = 805$), but not boys ($n = 828$). In addition, there may be differences in prosocial development between backgrounds due to differing input from parents and ingroup and outgroup biases. Future research should consider these questions in more diverse samples to investigate whether these differences are present and whether they impact results.

A second key strength was the use of the crying baby paradigm. Strengths of this paradigm included the involvement of both mothers and fathers, the use of a home setting and the inclusion of detailed behavioural coding rather than a reliance on questionnaire measures to assess empathy at 24-months, and the use of familiar settings and detailed behavioural coding at 36-months. However, a key limitation should also be noted. Both ethical (the paradigm elicited moderate distress for some of the toddlers) and scientific (a repeated exposure to the crying baby paradigm is likely to elicit strong practice effects) reasons ruled out a within-study design involving parallel sessions with each parent within the home visit. As such, the current results do not directly compare the responses toddlers when each parent was present, which may have introduced uncontrolled individual differences to the analyses.

The third strength lies in our measurement of screen usage, especially at 24-months. Though our overall measures of screen time are reliant on parent-report, the unique feature of asking mothers and fathers to report screen time allowed for a more reliable picture of children's usage. The technology interview at 24-months allowed for detailed information about what, when, where, and why children were engaging with screens, which afforded rich insight into individual children's screen lives. It also allowed for trained coders to listen for parents' responses and ensuring data reflected the construct in question rather than fully relying on parents' interpretations of questions. However, this method is limited as it still relies on parent reports, which could be flawed by parents' memories, response biases, or misunderstandings of questions. This method was chosen over a media diary in order to save parents' time and effort, especially as this interview was a small part of a larger study, but screen use diaries may increase the validity of this data if used in the future. In addition, several questions could have been asked in a more thorough manner. Most glaringly, it would have been beneficial to know what proportion of screen time parents spent engaging in screens with their children, rather than simply if they did or did not ever co-view.

A final strength of the current study was the novel detailed content coding. As results indicate, parents are not reliable judges of their children's television content. Therefore, it is especially important that trained coders were able to identify the behaviours within and format features of what children are watching, which allowed for more thorough analysis. This approach is novel and should be considered for screen usage work moving forward, especially with older children. Time did not allow for more than an hour of each television programme to be coded, but due to the formulaic quality of most children's programmes, this was not a large limitation. However, finding ways to streamline this

process, perhaps involving software coding rather than utilising human processing, would increase the validity of this measure. This coding, too, could have been more detailed, in that each action could have been coded as preceding or following other actions, especially in the case of prosocial and antisocial behaviour. In addition, what narrators and characters were conversing with audiences about should be coded in the future.

6.4. Reflection

This section will reflect upon the current project, elaborating on some of the strengths and weaknesses of the methods used and on several key interpretations of the work. In addition, future directions for the current body of work and the work it informs will be discussed briefly.

6.4.1. The New Fathers and Mothers Study and the current work. As noted, the current work was conducted as part of a large, international, prospective longitudinal study. This design allowed for efficient data collection, as team members were able to work together to collect more data from more participants, and provided opportunities for several avenues of research. However, as discussed below, some variables were not as thoroughly measured as they could have been due to the overall load on families and a desire to keep this as low as possible. Notably, this design allowed for a more comprehensive experience of studying development during a PhD than is often achieved. As such, there were several constructs that I investigated during the research process that were not included in the current dissertation, but that may be related. As part of the benefit of being on a large team, I had the opportunity to code several parent-child interactions and parent and child separate interviews and tasks. Several of the constructs that the overall study explored may be related to screen time and/or prosocial behaviour in interesting ways, and may even confound the associations investigated within the current work. I hope

to explore them in published work beyond the scope of the current dissertation. For example, parental discipline during an inhibition task may contribute to how parents allocate screen time and may be associated with the reasons they give for allowing screen time. In addition, parents' warmth, sensitivity, mental-state talk, and mind-mindedness may be associated with prosocial measures and may explain some of the variance in a different way than screen time does. Further investigation into the complex associations of household life should be made.

6.4.2. Methods. The current project included a variety of methods with multiple informants. These methods were situated within a larger longitudinal study and were carefully selected to be psychologically sound but not too onerous on families. However, as with any methods, the chosen approaches have both strengths and limitations. Many of these are discussed in section 6.3, but some elaboration will be included in this section.

6.4.3. Prosocial behaviour measurement. Observational measures are more controlled and, often, more reliable than parent-reports and so were chosen to ascertain toddlers' prosocial behaviour. As previously discussed, the Crying Baby Paradigm was chosen for its naturalistic elements and for the experimental control that using one specific distress cry instead of an experimenter's or parent's, offers. The sharing paradigm was chosen for its simplicity. Since the current project was not about specific sharing parameters, a simple dictator game allowed for the clearest interpretation. Adding a parent- and/or teacher-report to the methods would have made the results more robust, and developing an appropriate questionnaire would aid future work. However, existing parent- and teacher reports have not been appropriately validated for use in identifying specific behaviours in toddlerhood and creating a new measure was beyond the scope of the

current project, in part because the project included the design of a new screen content measure, detailed below.

6.4.4. Screen content measurement. A novel coding scheme was created to measure children's content diets that included coding programmes children watched and then combining the means of each programme watched to create grand means for each child. This methodology allowed for a naturalistic approach, which allowed for a deeper understanding of how everyday screen time was related to children's everyday lives. However, several limitations deserve note, of which the most Important is the lack of experimental control. Instead of being able to investigate how specific content was related to specific results, random selection was used to choose episodes of programmes to code and the measurement scheme was reliant on parent-report. In addition, the need to maintain the brevity of parent interviews resulted in the omission of several variables that might have added some reliability to the measure. First, identifying what platforms children used to watch programmes would have allowed for more accurate selection of programmes to code, and enabled coders to find some of the programmes that proved difficult to locate.

Secondly, noting what proportion of each programme children watched as part of their television time would have allowed for weighted averages to be calculated, and greater understanding of prosocial and antisocial content diets. Finally, asking which programmes children watched could have been done with more rigour. Parents may have been answering based on what programmes they believed their children should be watching rather than based on what their children actually watch, or could have been reflecting on programmes that children watched in the past or had just begun to show an interest in. Asking what children watched the day prior and also on a weekend day prior may have been a more accurate approach.

Another important aspect of the content coding to consider is the operationalisation of prosocial content. Prior research into prosocial television has relied on specific behaviours and modelling (e.g., Bandura, 1965; Sprafkin, Liebert, & Poulos, 1975) to establish an association between televised content and behaviour. However, prior research had not investigated the programmes children were watching at home in their everyday lives for this kind of imitative learning. Therefore, these overt behaviours were selected as the content of interest in order to create a bedrock of understanding about prosocial learning from everyday screen time. However, research since the 1970s has established that there are several other important socialisation processes by which prosocial behaviour is developed. These methods are discussed at length in section 1.3, and include elements such as warmth and conversational reference to thoughts and feelings (i.e., 'mental state talk'). These other socialising processes are also likely to be included in television programmes, and may contribute to prosocial learning. Future research should build upon the work done in the current project to consider these other socialisation mechanisms on screen by coding other elements of interaction.

6.4.5. Screen time quantity measurement. Screen time quantity was measured through parent questionnaires. Although parent-report and parent memory are subject to response bias or failed memory, parent-report is a time-efficient means of gathering adequate information. In the future, questions such as 'how long did your child spend watching television' and 'how long did your child spend using a mobile device' should be refined to invite parents to provide information about what children were doing on these devices. Interview questions at T2 made it clear that most children were using the devices the same way, to watch television content, but asking about them separately creates confusion. In addition, the current study did not include any reliable measure of background

television and other incidental screen exposure. Future studies should ensure that specific questions about incidental television are included. Screen time diaries may have been a more precise measure of screen time usage, and would have allowed for more information about what exactly children were watching and how much of it they were watching, but were not included in the current study because the parents were already completing extensive questionnaire measures for the framing study.

6.4.6. Parental intentions, attitudes, and activities measurement. The technology questionnaires and interviews provided detailed information about parents' intentions and reasons for allowing screen time, attitudes about specific programmes, and whether parents watched programmes with their children. This interview was created for the study, and, despite pilot work, several aspects of the interview proved to be inadequate and should be done differently in the future. Most notably, greater understanding of co-viewing could be achieved by asking what parents were actually doing when their children were watching television each and establishing what proportion of time parents spent watching programmes with their child actively engaging with their child.

6.4.7. Words of caution. Two interpretations made throughout the dissertation deserve a note of caution. First, understanding the non-significant findings as evidence for a transfer deficit should be taken with important consideration for the learning process. For a transfer deficit to occur, learning has to happen first and then be lost in translation. It could be that children did not learn at all, and that is why there were not significant associations between screen time content and prosocial outcomes. However, it could also be true that this learning did take place and children were unable to reproduce what they saw in real life, suggesting a transfer deficit. Moving forward from the current work, some lab-based research is needed to establish whether social learning can take place in the first instance.

Second, the current study investigated a specific range of programmes that were reported by a particular set of parents at a particular point in history. Just as prior research that investigates one specific programme leaves gaps to be filled in understanding how children's content is related to outcomes, the current range of programmes, though large, also leaves some gaps. In particular, as discussed in section 6.3, the sample was largely heterogeneous, affluent, and educated. These demographic features may have impacted what programmes children were shown and therefore may limit the generalisability of the range of programmes investigated. Caution should be exercised when parents and other caretakes are considering how to use the information reported here when deciding what programmes to show their children.

6.4.8. Future directions. As discussed throughout, there are several lessons learned to consider when taking forward this programme of research. The current study provided a methodological framework for studying television content in children's everyday lives and for establishing the technological landscape of a household. However, several elements of these measures should be refined in future use. In addition, many other household and family functioning variables may be involved the associations discussed. My work in the near future will focus on these associations and the study findings will inform my future research into the impact of screen time on children's adjustment and development.

6.5. Conclusions

In all, the current work points to several developmental trends in toddlerhood. First, it does appear that children are, perhaps even more so than in 1961, enjoying a childhood in which "the view through the picture tube is as much a part of the home setting as the view through the picture window" (Schramm, Lyle, & Parker, 1961, p 24). Second, the content children are watching is as varied as the toddlers in the study were, but boys and girls were

essentially getting the same screen time experience. Third, prosocial behaviour outcomes showed individual differences and some long-term stability. In addition, there was a change in presentation of prosocial behaviour over time in the crying baby paradigm. Finally, screen time and prosocial behaviour were largely unrelated, suggesting there was not a deficit in social development due to either spending too much time watching screens or too little time doing other socialising activities. The current work also corroborated prior research that established a transfer deficit for toddlers learning specific skills from screens to include an understanding of a transfer deficit for social learning. In all, the outlook for prosocial behaviour in a world saturated with technology is not bleak, but there are some important considerations to be made when deciding how to use screen time well.

Appendix A: Participant Information and Consent Forms

New Fathers and Mothers Study: 14-Month Home Visit
Parent Information Sheet

We hope you all enjoyed your child's 1st birthday. We are very excited to invite you to take part in the next wave of the study now your child is approaching 14 months of age.

In this visit, we would like all our study participants (both parents and children) to complete some short tasks. For parents, these will be presented on a lap-top and are designed to tap into thinking skills (e.g., memory, flexible thinking) and will take no more than 20 minutes. For children, the tasks involve simple activities to index their growing language skills and non-verbal skills (e.g., ability to wait for an attractive toy). We will also send you some cotton swabs and ask you to collect saliva from your child at three times during the day (just as you did for yourself). We will enclose a step-by-step guide that explains how to collect and store the samples. We will also film each parent interacting with their child in a fun play-based activity.

As before, we are happy to visit at a time that is convenient for your family (if weekdays or evenings are not possible, we are willing to arrange visits at the weekend). We aim to complete the visit in about 1 hour. All the video and audio data from the study are treated as strictly confidential and, in compliance with the Data Protection Act, kept only identifiable by code in a locked cupboard in our research office, which only researchers working on the study can access. The video data will be subsequently destroyed after 2 years.

As thanks for giving up your time to take part in the study, we will give both parents taking part in the study £15 and a small gift for your child. We will also give you a copy of the videos taken during the visit when your little one was 4 months old – in our experience, when children get bigger, they very much enjoy seeing themselves as babies!

You and/or your family can opt out of the study at any time without giving a reason and without consequence. You are also are free to withdraw your data from the study upon request – so that any records, film, video- or audio-recordings and notes will be destroyed.

Hope to see you all again soon!

UNIVERSITY OF CAMBRIDGE
Centre for Family Research

Consent Form
New Fathers and Mothers Study: 14-Month Home visit

Please initial box

1. I confirm that I have read the information sheet for this wave of the New Fathers and Mothers Study. I have had an opportunity to consider the information, ask questions and received satisfactory answers. ☐

2. I understand that my participation is voluntary and that I am free to withdraw at any time without giving any reason, without my medical care or legal rights being affected. ☐

3. I understand that anonymous information collected about me may be used to support other research and shared with other researchers. ☐

4. I understand that my infant and I can opt out of specific questions or tasks without consequence. ☐

5. I agree to participate in this study by completing the home activities with my infant, the questionnaire-based interview and the cognitive assessments. ☐

_____ _____ _____

Name of Participant Date Signature

_____ _____ _____

Name of Person Date Signature

taking consent

This study has been approved by the Cambridge Psychology Research Ethics Committee and by the local NHS Ethics Committee.

UNIVERSITY OF CAMBRIDGE
Centre for Family Research

New Fathers and Mothers Study: 24-Month home visit Information Sheet

Almost another year has flown by since we last visited you and your family. We are very much looking forward to seeing you all again now that your little one is turning two!

We would again like to visit you at home and for both parents and their child to complete some short tasks. For parents, we have a short interview for you about parenting and as before, we'll ask you to complete an online questionnaire before we visit. For children, we have another set of tasks and games to learn about their growing thinking skills. We also have some activities for parents and children to do together (reading a book, playing with Duplo and playing with a bag of toys).

As before, we are happy to visit at a time that is convenient for your family (if weekdays or evenings are not possible, we are willing to arrange visits at the weekend). We aim to complete the visit in about 1 hour and 30min. All the video and audio data from the study are treated as strictly confidential and, in compliance with the Data Protection Act, kept only identifiable by code in a locked cupboard in our research office, which only researchers working on the study can access. The video data will be subsequently destroyed after 2 years.

As thanks for giving up your time to take part in the study, we will give both parents taking part in the study £15 and a small gift for your child. We will also give you a copy of the videos taken during the visit when your little one was 14 months old – in our experience, when children get bigger they very much enjoy seeing themselves as toddlers!

You and/or your family can opt out of the study at any time without giving a reason and without consequence. You are also are free to withdraw your data from the study upon request – so that any records, film, video- or audio-recordings and notes will be destroyed.

Hope to see you all again soon!

UNIVERSITY OF CAMBRIDGE
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Consent Form
New Fathers and Mothers Study: 24-Month Home visit

Please initial box

1. I confirm that I have read the information sheet for this wave of the New Fathers and Mothers Study. I have had an opportunity to consider the information, ask questions and received satisfactory answers. ☐

2. I understand that my participation is voluntary and that I am free to withdraw at any time without giving any reason, without my medical care or legal rights being affected. ☐

3. I understand that anonymous information collected about me may be used to support other research and shared with other researchers. ☐

4. I understand that my infant and I can opt out of specific questions or tasks without consequence. ☐

5. I agree to participate in this study by completing the home activities with my infant and the questionnaire-based interview ☐

6. I agree to my infant participating in this study by completing the cognitive assessments ☐

_____ _____ _____

Name of Participant Date Signature

_____ _____ _____

Name of Person Date Signature

taking consent

This study has been approved by the Cambridge Psychology Research Ethics Committee and by the local NHS Ethics Committee.

UNIVERSITY OF CAMBRIDGE
Centre for Family Research

New Fathers and Mothers Study: 36-Month Nursery visit
Teacher Information Sheet

Dear _____,

The family of (ADD CHILD'S NAME) has been taking part in a longitudinal study that has involved four waves of home visits (before NAME's birth and at 4, 14 and 24 months). We would now like to visit all the study children at nursery at around 36-months. NAME's birthday is in MONTH and so we are writing to ask whether a nursery visit would be possible and if so, when it would be most convenient. We have attached a completed parental consent form.

What will the visit involve for NAME?

During the visit, we would like to administer a set of individual tasks for NAME. These include: (a) a receptive vocabulary test; (b) tasks that tap children's ability to think ahead and inhibit impulsive actions (these are very similar to those NAME completed in the 24-month home visit); and (c) brief puppet/picture vignettes that assess early 'mindreading' skills (e.g., the ability to recognize that someone can hold a mistaken belief). This session will be filmed and NAME's parents will receive a copy of the video as a thank you for their continued support.

What will the visit involve for NAME's key worker?

A key goal of this wave of our study is to gain nursery staff's views on each child's strengths and difficulties, their social relationships and their 'school readiness'. One week before the agreed date for the visit we will therefore send you a link to an online questionnaire, which we would be grateful if NAME's key worker could complete. We are also hoping that most if not all key workers would also be willing to be filmed with NAME in a 5-minute shared picture book task.

We aim to complete all of the activities in under an hour, and will do all we can to minimize disruption. All researchers have up-to-date DBS checks. Nursery staff are welcome (but not required) to observe our work. All the study data are treated as strictly confidential and, in compliance with the Data Protection Act, kept only identifiable by code in a locked cupboard in our research office, which only the team can access. Video data will be destroyed 2 years after completion of the study. You can opt out of at any time without giving a reason or consequence and can also request to withdraw your data from the study – so that any notes or recordings will be destroyed. If you have any questions or concerns please contact Gabrielle McHarg (ggm25@cam.ac.uk, Dr. Anja Lindbert (ahl27@cam.ac.uk) or Professor Claire Hughes (ch288@cam.ac.uk).

Thank you for your help with this project – your support is greatly appreciated!

UNIVERSITY OF CAMBRIDGE
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Teacher Consent Form
New Fathers and Mothers Study: Nursery Visit

Please Initial Box

1. I confirm that I have read the information sheet for this study and have had an opportunity to consider the information, ask questions, and received satisfactory answers. ☐

2. I understand that my participation and that of my class members is voluntary and that I am free to withdraw our participation at any time without giving any reason and without punishment. ☐

3. I understand that I can opt a child out of specific tasks for any reason and without punishment. ☐

4. I understand that anonymous information collected about me and my class may be used to support other research and shared with other researchers. ☐

5. I agree to participate in this study by completing the nursery-based activities and by completing the questionnaires. ☐

_____

Name of Child

_____

Name of Nursery

_____ _____ ____/____/____

Name of Teacher Signature Date

This study has been approved by the Cambridge Psychology Research Ethics Committee.

UNIVERSITY OF CAMBRIDGE
Centre for Family Research

New Fathers and Mothers Study: Age Three Nursery Visit
Parent Information Sheet

We are looking forward to seeing your child again when he/she turns three! As explained in our newsletter, a gap in funding means that this study wave will consist of one-hour nursery visits that will involve:

1) Child tasks that are very similar to those completed in the 24-month home visit and tap children's ability to think ahead and inhibit impulsive actions.
2) A picture-based test of children's receptive vocabulary
3) Brief puppet/picture vignettes that assess early 'mindreading' skills (e.g., the ability to recognize that someone can hold a mistaken belief).
4) An online questionnaire for teachers, to gain their views of children's "strengths and difficulties" and social relationships.

We will arrange dates for nursery visits well in advance, to avoid multiple visits to individual nurseries. If you are happy for us to contact your child's nursery, please use the free post envelope to return the completed consent form. Approximately one week before each visit we will let you know which team member is likely to be visiting your child and when; at this time we will also ask you to complete similar questionnaires to those given to teachers. This information is invaluable, and we really appreciate your help.

We will soon send out copies of the videos taken during the visit when your little one was 14 and/or 24 months old – in our experience, when children get bigger they very much enjoy seeing themselves as toddlers! All the video and audio data from the study are treated as strictly confidential and, in compliance with the Data Protection Act, kept only identifiable by code in a locked cupboard in our research office, which only researchers working on the study can access. The video data will be destroyed 2 years after completion of the study. You can opt your child out of the study at any time without giving a reason and without consequence. You are also are free to withdraw your data from the study upon request – so that any records, film, video- or audio-recordings and notes will be destroyed. As in previous visits, the age-3 task sessions will be filmed. As a thank you for your continued support we will send you a copy of the video, together with another small gift commissioned from the same artist as at previous study time-points (Karin Eklund).

If you have any questions or concerns, please contact Gabrielle McHarg (ggm25@cam.ac.uk) or Prof Claire Hughes (ch288@cam.ac.uk).

Thanks again for all your help, we can't wait to see how much your little one has grown!

UNIVERSITY OF CAMBRIDGE
Centre for Family Research

Primary Caregiver Consent Form
New Fathers and Mothers Study: 36-Month Nursery Visit

Please initial box

1. I confirm that I have read the information sheet for this wave of the New Fathers and Mothers Study. I have had the opportunity to consider the information, ask questions and have had these answered satisfactorily. ☐

2. I understand that my child's participation is voluntary and that I am free to withdraw at any time without giving any reason, without my medical care or legal rights being affected. ☐

3. I understand that anonymous information collected about me may be used to support other research and shared with other researchers. ☐

4. I understand that my child can opt out of specific questions or tasks without consequence. ☐

5. I agree to participate in this study consenting for my child to participate, and by completing the online questionnaire. ☐

_____

Name of Child

_____

Name of Nursery

_____ _____ ____/____/____

Name of Parent Signature Date

This study has been approved by the Cambridge Psychology Research Ethics Committee.

Appendix B: Technology Interview Questions

We know that TVs and screens have become a part of life for children, and we know from research that young children today are spending a good deal of time in front of screens. We are interested in what the potential benefits of this trend may be. We are also interested in how much time children spend engaging with media, because we really don't know. Would you be willing to answer a few questions about your child's screen time?

Great, thank you so much!

First of all, what devices do you have in your home? (be sure to ask about smartphones if they aren't mentioned)	TV Tablet Smart Phone Desktop Computer Laptop Computer Other:
Does [CHILD] enjoy watching Zoo Lane, Peppa Pig, In the Night Garden, Charlie and Lola… any particular shows or movies? (get up to 5)	1. 2. 3. 4. 5.
Does he/she have a favourite show? A favourite character? (just their very favourite)	Show: Character:
What does he/she like about that show? That character?	Show: Character:
What do you like about [that favourite show]? About [that favourite character]?	Show: Character:
Which devices does [CHILD] typically use to watch [SHOWS], including on iPlayer?	TV Tablet Smart Phone Desktop Computer Laptop Computer Other:

Do you have any rules about using devices? About watching television shows? (see what they answer, but ask further about content or amount of time if they haven't answered both already)	
Do you and your partner have the same rules? (if not) How do you choose which rules [CHILD] will follow?	Yes No Notes:
Do you find these rules easy to enforce? How do you see these rules changing as [CHILD] gets older?	
What time of day does [CHILD] usually watch television shows? How long at that time/those times?	Time 1: Length (mins): Time 2: Length (mins): Time 3: Length(mins):
So yesterday, how much time did [CHILD] spend watching television shows? Is that typical for a [weekday or weekend day depending on what day it is]? What is typical on a [whichever it isn't- weekend or week day]	Today: Typical for weekend: Typical for weekday:
(only ask this if there is discrepancy between what parent has outlined and what parent's rules are) So, would you say it's typical for your child to watch about ____ hours of television shows in a day at home?	Amount: Does parent agree: Yes No
What are you usually doing while [CHILD] is watching television shows? [at whatever time they mentioned- if it is multiple times, ask for each]	Time 1: [5]Parent's activity: Time 2: Parent's activity: Time 3: Parent's activity: Additional notes:

[5] **1.** Sitting down with child **2.** In same room but not necessarily with child **3.** In different room from child

Does he/she often watch TV at [daycare or a child minder's or nursery] or at a family member's house?	
How often is the TV on in the background (where child can hear and/or see it) while your child is awake and doing other things?	

Thank you, now we are going to shift to some questions about the other devices you mentioned. (only ask questions applicable for devices mentioned/allowed to child)

Does your child have a favourite app or game on the computer, tablet, or phone? (get up to 5)	1. 2. 3. 4. 5.
What do you like about those apps/games?	
What time of day does [CHILD] usually play games on a computer, tablet, or phone? Ok, and for how long at that time?	Time 1: Length (mins): Time 2: Length (mins): Time 3: Length (mins):
Yesterday, how much time did [CHILD] spend playing on the computer or with a tablet? Is that typical for a [weekday or weekend day depending on what day it is]? What is typical on a [whichever it isn't-weekend or week day]?	Today: Typical for weekend: Typical for weekday:

(only ask if discrepancy between above answers and rules stated earlier) So, would you say it's typical for your child to play for about ____ hours in a week?	Amount: Does parent agree: Yes No
What are you usually doing while [CHILD] is playing on the computer or tablet?	Time 1: [6]Parent's activity: Time 2: Parent's activity: Time 3: Parent's activity: Additional notes:
Does he/she also watch videos (that aren't TV shows) on the tablet or computer? My Magic Pet videos, or videos of his/her favourite characters?	Yes No 1. 2. 3. 4. 5.
How much time did he/she spend watching videos on tablet/computer yesterday? Is that typical for a [weekday or weekend day depending on what day it is]? What is typical on a [whichever it isn't- weekend or week day]?	Today: Typical for weekend: Typical for weekday:
What time of day does [CHILD] usually watch videos on a computer or tablet? Ok, and for how long at that time?	Time 1: Length (mins): Time 2: Length (mins): Time 3: Length (mins):
Does your child ever use a tablet, computer, or phone for video chatting (e.g., with grandparents)? How often? With whom does your child chat?	Yes No How often: Whom:
One more question: what are your favourite television shows to watch on TV or iPlayer? (get up to 5)	1. 2. 3. 4. 5.

[6] **1.** Sitting down with child **2.** In same room but not necessarily with child **3.** In different room from child

Appendix C: Information About Television Programmes and Films Included in Analysis

Name of Programme/Film	Network(s)/Production Company/ies	Included	CSM Recommended Minimum age of viewing	N Children Watched	Parents Reported on as favourite
Abney and Teal	CBeebies	Yes		3	0
Alphablocks	CBeebies	Yes		2	0
Alvin and the Chipmunks	20th Century Fox, Regency Enterprises, RatPac-Dune Entertainment, 20th Century Fox Home Entertainment, Bagdasarian Productions, Dune Entertainment	Yes	5	1	1
Andy's Wild Adventures	CBeebies	Yes		12	7
Baby Jake	CBeebies	Yes		8	1
Bagpuss	Smallfilms	Yes		1	0
Beauty and the Beast	Disney	Yes	6	1	0
Bedtime Story	CBeebies	Yes		1	0
Ben and Holly's Little Kingdom	Nick Jr., Frace 5, Channel 5, Nickelodeon	Yes	3	14	2
Big Barn Farm	CBeebies	Yes		2	0
Big Hero 6	Disney	Yes	7	1	0
Bing	CBeebies	Yes		35	18
Blaze and the Monster Machines	Nickelodeon, Nick Jr.	Yes	4	12	7

Name of Programme/Film	Network(s)/Production Company/ies	Included	CSM Recommended Minimum age of viewing	N Children Watched	Parents Reported on as favourite
Blippi	Blippi	Yes	4	2	2
Blue Planet	BBC One	Yes	6	4	0
Bob the Builder	BBC, PBS Kids, CBeebies, Public Broadcasting Service, CBBC, Channel 5	Yes	3	13	4
Brave	Disney Pixar	Yes	8	2	0
Caillou	PBS, Télé-Québec, Teletoon, TVOntario, Treehouse TV, Sky Witness, Turner Broadcasting Service Europe, Tiny Living	Yes	3	1	0
Cars	Disney Pixar	Yes	5	3	2
Charlie and Lola	CBeebies	Yes	4	11	1
Chuggington	CBeebies	Yes	3	3	0
Cinderella	Disney	Yes	5	2	2
Curious George	PBS Kids	Yes	3	1	0
Digby Dragon	Nick Jr., Channel 5	Yes	4	2	0
Dinobabies		Not Available		1	0
Dinopaws	CBeebies	Yes		3	2
Dinosaur Train	PBS Kids	Yes	3	2	0

Name of Programme/Film	Network(s)/Production Company/ies	Included	CSM Recommended Minimum age of viewing	N Children Watched	Parents Reported on as favourite
Dinotrux	Netflix	Yes	7	2	0
Do You Know	CBeebies	Yes		5	2
Dora the Explorer	Nickelodeon	Yes	3	2	2
Finding Nemo	Disney Pixar	Yes	5	2	1
Fireman Sam	CBeebies, CBBC, S4C, Channel 5, GMTV, S4C Authority, BBC Two, Turner Broadcasting System Europe	Yes	3	21	8
Frozen	Disney	Yes	5	4	4
Gigglebiz	CBeebies	Yes		2	1
Go Jetters	CBeebies	Yes	4	17	3
Gruffalo Films	BBC One	Yes	3	10	4
Hey Duggee	CBeebies, Nick Jr., Discovery Kids	Yes	3	36	20
Hey Hey		Too Vague		1	0
Horrible Histories	CBBC	Yes	8	1	0
How to Train Your Dragon	DreamWorks	Yes	7	2	0
In the Night Garden	CBeebies	Yes		67	14
Kung Fu Panda	DreamWorks	Yes	6	1	0

Name of Programme/Film	Network(s)/Production Company/ies	Included	CSM Recommended Minimum age of viewing	N Children Watched	Parents Reported on as favourite
Lego Jurassic Park	The Lego Group	Yes	10	2	1
Lion King	Disney	Yes	6	3	1
Little Red Tractor		Not Available		2	1
Madagascar	DreamWorks	Yes	7	1	0
Masha and the Bear	Universal Kids, Carousel, Russia-1	Yes	4	4	6
Mickey Mouse Clubhouse	Disney Junior, Playhouse Disney, Disney Channel	Yes	2	2	3
Milkshake Monkey	Channel 5	Yes		2	1
Minions	Illumination Entertainment	Yes	5	4	1
Moana	Disney	Yes	6	3	2
Morph		Not Available		2	1
Mr. Bean	CITV, ITV, Disney Channel, Nicktoons	Yes	12	1	1
Mr. Tumble	CBeebies	Yes		44	25
Muppets		Too Vague		1	1
Numberblocks	CBeebies	Yes		6	0

Name of Programme/Film	Network(s)/Production Company/ies	Included	CSM Recommended Minimum age of viewing	N Children Watched	Parents Reported on as favourite
Nursery Rhymes		Too Vague		10	6
Octonauts	CBeebies	Yes	4	23	2
Our Family	CBeebies	Yes		3	3
Panda and Bear		Too Vague		1	0
Patchwork Pals		Too Vague		2	0
Paw Patrol	Nickelodeon, TVOKids, TVOntario	Yes	3	34	19
Peppa Pig	Nick Jr., Channel 5, Cartoon Network, Televisión Nacional de Chile, Nick Jr. Too, TV Avala, Viacom International Media Network	Yes	3	81	54
Peter Rabbit	CBeebies, Nickelodeon, Nicktoons	Yes	4	28	11
Pingu	CBeebies, CBBC, BBC Two	Yes	3	3	3
Planes	Disney	Yes	5	1	1
Postman Pat	CBeebies	Yes	3	33	11
Puffn Rock	Netflix, Nick Jr.	Yes	3	1	2
Raa Raa the Noisy Lion	CBeebies	Yes		11	4

Name of Programme/Film	Network(s)/Production Company/ies	Included	CSM Recommended Minimum age of viewing	N Children Watched	Parents Reported on as favourite
Rio	Blue Sky Studios, 20th Century Fox Animation, 20th Century Fox	Yes	6	1	0
Room on the Broom	BBC, BBC One, PBS Kids Sprout	Yes	3	3	1
Sarah and Duck	CBeebies	Yes	3	15	7
Secret Life of Pets	Illumination Entertainment	Yes	6	1	1
Sesame Street		Not Available	2	7	1
Shaun the Sheep	BBC, BBC One, CBBC	Yes	5	3	0
Shimmer and Shine	Nickelodeon, Treehouse TV	Yes	3	2	0
Sleeping Beauty	Disney	Yes	5	1	0
Small Potatoes		Not Available		1	0
Spirit: Stallion of the Cimarron	DreamWorks	Yes	7	2	0
Stickman	BBC One	Yes		2	1
Super Truck		Not Available		1	1
Swashbuckle	CBeebies	Yes		6	1
Tangled	Disney	Yes	5	1	0

Name of Programme/Film	Network(s)/Production Company/ies	Included	CSM Recommended Minimum age of viewing	N Children Watched	Parents Reported on as favourite
Tayo The Little Bus	TV JOJ, Disney Junior Asia, Educational Broadcasting System, Markíza	Yes	3	2	0
Tchoupi et Doudou		Not in English		1	2
Teletubbies	BBC Two, CBeebies	Yes	2	35	4
The Backyardigans		Not Available		1	0
The Clangers	CBeebies	Yes	3	19	4
The Little Mermaid	Disney	Yes	5	3	0
The Simpsons	FOX	Yes	12	1	0
The Sound of Music	20th Century Fox	Yes	6	1	0
The Wiggles	Australian Broadcasting Company, Disney Channel	Yes	3	1	0
Thomas the Tank Engine/Thomas and Friends	PBS Kids, ITV, Channel 5, Cartoon Network	Yes	3	55	21
Timmy Time	CBeebies, Treehouse TV, Turner Broadcasting System Europe	Yes	2	3	0
Topsy and Tim	CBeebies	Yes	5	7	4

Name of Programme/Film	Network(s)/Production Company/ies	Included	CSM Recommended Minimum age of viewing	N Children Watched	Parents Reported on as favourite
Tractor Ted		Not Available		3	0
Tractor Tom		Not Available		3	2
Trolls	DreamWorks	Yes	6	1	1
Twirlywoos	CBeebies	Yes		17	1
Wallace and Gromit	DreamWorks, Aardman, BBC	Yes	7	1	0
Wanda and the Alien	Channel 5, Nick Jr.	Yes		1	0
Waybuloos	BBC, CBeebies, Tiny Pop, Treehouse TV, ABC, BBC HD, Kids Talk Talk	Yes	3	1	0
We're Going on a Bear Hunt	Lupus Films, Walker Productions, Herrick Entertainment	Yes		1	0
Winnie the Pooh		Too Vague		5	2
Wissper	Channel 5, TG4	Yes		2	0
Woolly and Tig	CBeebies	Yes		1	0
Zoo Lane		Not Available		1	0

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